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MATERIALS FOR A FLORA OF FORMOSA

Supplementary notes to the Enumeratio Plantarum Formosanarum and Flora Montana Formosæ, based on a Study of the Collections of the Botanical Survey of the Government of Formosa, principally made at the Herbarium of the Royal Botanic Gardens, Kew.

By

B. Hayata, *Rigakuhakushi.*

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Supplementary notes to the Enumeratio Plantarum Formosanarum and Flora Montana Formosæ, based on a Study of the Collections of the Botanical Survey of the Government of Formosa, principally made at the Herbarium of the Royal Botanic Gardens, Kew.

By

B. Hayata, *Rigakuhakushi*

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Introduction.

Since the publication of the Enumeratio Plantarum Formosanarum[1] and Flora Montana Formosæ,[2] a large number of collections has been sent to me for determination, by the Government of Formosa. The collections are in greater part from the mountainous regions of the island and contain a considerable number of novelties. As the flora of Formosa has a close affinity to the floras of Japan and China, it is very important, in order to work up the materials, to make an exhaustive comparison of the collections with specimens from the two countries.

MAR 5 - 1937

1) Matsumura, J., and Hayata, B.—Enumeratio Plantarum Formosanarum, in Journ. Coll. Sci. Imp. Univ. Tōkyō, XXII., 702 pages, with 18 plates, 1906.

2) Hayata, B.—Flora Montana Formosæ, in Journ. Coll. Sci. Imp. Univ. Tōkyō, XXV. Art.—19, 260 pages, with 41 plates, 1908.

At the same time, as the flora of the island contains a considerable number of elements from India, including the Himalayas and the Malay peninsula and archipelago, it is equally desirable for my work that the same should be done with the specimens of the regions above mentioned. For a comparison with Japanese specimens, the Herbarium at Tōkyō will answer fairly well, as it includes nearly all Japanese plants, though not exhaustively. Chinese plants, however, are here only very poorly represented. I, therefore, found it very unsatisfactory to work up so big a collection only in the Herbarium at Tōkyō. Moreover, as a considerable number of Chinese plants are represented in the Herbarium at Kew, and also in that at Dahlem, and the type specimens of Franchet are especially preserved in the Herbarium at Paris, and those of Maximowicz, in that at St. Petersburg. I thought it very necessary for my work to see all the plants represented in the principal herbaria of the West. It was my great good fortune that I was given an opportunity of visiting these different herbaria in order to make an exhaustive comparison of my materials with the collections preserved in them. With this intention I first went to Kew taking all my materials with me. There I pursued my work with specimens of the floras to which our flora is more or less related. The comparison made, in most cases, was confined to the flora of Asiatic regions, especially, to China, Korea, India, the Himalayas, and the Malay peninsula and archipelago ; but, sometimes, it was extended, when necessary, to Australia, the Arctic and Antarctic regions, Europe, Africa, America and even to Polynesia. I found that many of the species of my collections are represented in the Chinese herbarium at Kew, and also among the specimens from other regions. At the same time, I found also that the greater part

of my materials is not yet represented at Kew, and that, in great probability, they are species not yet described. After finishing my work at Kew,[1] I went to the Herbarium at Paris, in order to see the type specimens of Chinese plants mainly described by FRANCHET. Then, my work was pursued in the Herbarium at Dahlem where are preserved a good many collections of Asiatic flora. My purpose in going to Dahlem was to see especially the specimens mentioned in Prof. DIELS' "Die Flora von Central China."[2] In Dahlem, as in Paris, I devoted myself to making notes of the specimens preserved there, as I had not brought my materials with me. I especially devoted myself to making sketches, on tracing paper, of the specimens which are represented only in Dahlem and nowhere else, so that I could make a close comparison with these sketches on my return to Tōkyō. After finishing my work, I went, with the same purpose, to the Herbarium at St. Petersburg, in order to see the type specimens of MAXIMOWICZ. During my work on the continent, I was successful in placing some species which I had not been able to determine at Kew. Still, many of the plants in my collections which remain as yet undetermined, are not represented in any of the herbaria on the continent. It is, therefore, highly probable that they are species not yet described.

The plants mentioned in the present work are mostly of species newly described and, if not, they are new to the flora of Formosa, though there are a very few which were previously

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1) DIELS, L.—Die Flora von Central China, in ENGL. Bot. Jahrb. XXIX, pp. 169–657.

2) During my stay at Kew, I was away from my work, for a little more than a week, when I went to Brussels to take part in the International Botanical Congress, then being held there, at which I presented a paper entitled "Botanical Survey of the Government of Formosa, with short Sketches on the Vegetation and Flora of the Island." The paper is now in press at Brussels.

recorded from that island. The references here made under each species are extremely limited, as there is no space for full accounts. Critical views regarding species already described by myself or by others, are here given. In the present work, it is my desire to mention all the species recorded from Formosa, which have appeared in different publications, since the issue of the Enumeratio Plantarum Formosanarum and Flora Montana Formosæ. So that, practically speaking, the present work is an exhaustive supplement bringing our former publications up to date.

To mention the number of species of the flora* of the island, known to us up to the present time, there are, in the Enumeratio, 1999 species belonging to 701 genera and 153 families. In my Flora Montana, 392 species are mentioned belonging to 266 genera and 70 families ; in the present work, I have mentioned 735 species belonging to 343 genera and 109 families, thus adding to our present knowledge of Formosan flora, 567 species, 72 genera and 2 families. Excluding all those species which appear for a second or third time, in the above three papers, the total number of the plants of the island is 2660 species belonging to 836 genera and 156 families. The following list shows genera added to those mentioned in our former publications. Most of them are new to the flora of the island.

Isopyrum.	*Canarium.*	*Prinsepia.*
Braenia.	*Allophyllus.*	*Callitriche.*
Uvaria.	*Pometia.*	*Tashiroea.*
Cochlearia.	*Albizzia.*	*Bupleurum.*
Thespisia.	*Pirus.*	*Pimpinella.*
Suriana.	*Cotoniaster.*	*Phellopterus.*

* The term flora used in this work includes flowering plants, ferns and their allies.

Oreomyrrhis.
Osmorhiza.
Angelica.
Abelia.
Nauclea.
Guettarda.
Coprosma.
Triplostegia.
Lagenophora.
Cotula.
Codonopsis.
Embelia.
Maba.
Melodinus.
Heterostemma.
Paulownia.
Hemiphragma.
Titanotrichum.
Oreocharis.
Hemigraphis.
Acrocephalus.
Lycopus.
Melissa.
Cryptocarya.
Illigera.
Chamabaina.
Juglans.
Platycarya.
Castanea.
Halophila.
Oberonia.
Cirrhopetalum.
Chrysoglossum.
Collabium.
Spathoglottis.
Bletia.
Pleione.
Sarcochilus.
Saccolabium.
Cleisostoma.
Apendicula.
Aphyllorchis.
Galera.
Herminium.
Hemipilia.
Floscopa.
Pinellia.
Zannichellia.
Remirea.
Cladium.
Thuarea.
Eremochloa.
Acrophorus.
Oleandra.
Monachosorum.

In the present work, a few species are mentioned under families different from those to which they are referred in the former publications. As the alteration of families is a matter of importance, I shall here try to comment briefly on this point. There are three species which are properly transferred from one family to another. One is a plant which was called *Rehmannia Oldhami* HEMSL, formerly referred to Scrophularineæ, but now to Gesneraceæ. The reference to the species is given under the heading of the genus. The plant was first referred to *Rehmannia*[1] by W. B. HEMSLEY who afterwards thought it better to regard it as representing a distinct genus from *Rehmannia*. He then established a new genus, *Matsumuria*,[2] for the plant, and referred it to Gesneraceæ on account of its perfectly one-called

1) HEMSLEY, W. B. in Ann. Bot. IX. p. 154.
2) HEMSLEY, W. B. in Kew Bull. Dec. (1909), p. 360.

ovary with two parietal placentæ. Almost at the same time, this plant attracted the attention of SOLEREDER who saw the very same specimen at Kew, and established a new genus called *Titanotrichum*[1] which was published in September, 1909, when the description of HEMSLEY was in press. The priority has at last been given to the genus of SOLEREDER. In the present work, the plant is mentioned as *Titanotrichum Oldhami* SOLERED. and is referred to Gesneraceæ. Another plant is *Logania dentata*[2] formerly described by myself, which should be transferred from Loganiaceæ to Scrophularineæ. In 1906, when I published the plant in my Flora Montana Formosæ, I was informed by Mr. E. D. MERRILL that he thought that the Philippine plant *Nertera dentata* ELMER[3] (with which my plant is identical) should be referred to *Hemiphragma heterophylla* WALL. of the Himalayas. I also alluded to this matter in the foot notes to my paper in which I expressed the opinion that it was still questionable whether my plant should be referred to *Hemiphragma* or not. At Kew, I compared it with the type of the latter species and found that they were very similar excepting slight differences in the number of the corolla-lobes and in the attachment of the stamens to the corolla-tube. So far as I can ascertain from the description of *Hemiphragma* given in BENTHAM and HOOKER, f. "Genera Plantarum II. p. 959," the genus has a five-lobed corolla and four stamens, affixed to the base of the tube. But, in my plant, the corolla is four-lobed and the stamens are also four, but, affixed to the middle of the tube. It may be questioned, however, if the flowers of my plant may not be imperfect ones, as it was

1) SOLEREDER, in Berichit. Deutsch. Bot. Gesellsch. V.—27. p. 400 (Sept. 1909).
2) HAYATA, B.—Fl. Mont. Formos. p. 163.
3) ELMER, in Leafl. Philipp. Bot. I–1, p. 15.

collected when the flowering season was nearly over. I examined a considerable number of the specimens, but I could not find more than one or two flowers upon which the description and figures in my papar could be based. It may be well conjectured that my plant in the normal state of its flowers may have a five-lobed corolla with four stamens. I therefore think it better to transfer my plant from Loganiaceæ to Scrophularineæ, referring it to *Hemiphragma heterophylla* WALL. Another plant which I may here mention, is *Ellisiophyllum pinnatum* MAKINO, which was referred to Hydrophyllaceæ, but, in the present work, is transferred to Scrophularineæ. In 1871, MAXIMOWICZ established the same genus upon a Japanese plant in "Mél. Biol. Vol. XIII. p. 18", then named by him as *E. reptans*. It is very probably to be referred to Polemoniaceæ, because of its seeds which produce a considerable amount of mucilage in the moist condition,— a character which is all but peculiar to the same family. The plant has also a close relation with Hydrophyllaceæ, so far as the leaves and flowers are concerned. It seemed, therefore, rather questionable to MAXIMOWICZ himself, to what family the present genus should be referred. In 1876, the same genus was referred to Hydrophyllaceæ by BENTHAM and HOOKER. f. in their "Genera Plantarum" II. p. 829. A little later, in 1890, it was referred to Scrophularineæ by BAILLON in "Bull. Soc. Linn. Paris, No. 103." Here, he expressed his opinion that the doubtful genus belongs neither to Polemoniaceæ nor to Hydrophyllaceæ, but to Scrophularineæ. Moreover, he stated that its nearest of kin is *Litorella* of the same family. In 1892, it was again referred to Hydrophyllaceæ by PETER in "ENGL. u. PRANTL. Nat. Pfl.-fam. IV. 3–a, p. 63." As to the nomenclature of the plant, there had been no difficulty, until Mr. T. MAKINO (1906) called his attention

to the similarity of the figures of *Moseleya pinnata* HEMSL. in HOOKER's Ic. Pl. XXVI. t. 2592, (1892), and his drawings of *Ellisiophyllum reptans* MAXIM. which he had just made. The same plant is an extremely troublesome one, as to its genus and species as well as its family. Previous to the establishment of *Ellisiophyllum* by MAXIMOWICZ, the same plant was found in Nepal and is described as *Mazus pinnatus* WALL. The plant was afterwards referred to *Ourisia* (1835), then to *Hornemannia* (1846), then to *Sibthorpia* (1876) and finally to *Moseleya* (1893). The last genus was established by W. B. HEMSLEY, as there was, as he thought, being quite unaware of *Ellisiophyllum* of MAXIMOWICZ, no proper genus for the plant. As is clearly seen in the comparison of the drawings of *Moseleya* and *Ellisiophyllum*, above mentioned, they are two different genera established for one and the same plant. Accordingly, it is clear that the former should be reduced to a synonym of the latter. The present plant should, therefore, be referred to *Ellisiophyllum* with the specific name of *pinnatum*, as is stated by Mr. T. MAKINO.[1] Now I may return to the question as to what family the plant should properly be referred? In my paper "Flora Montana Formosæ," I mentioned the plant under Hydrophyllaceæ. In 1909, Herr Professor A. BRAND wrote me that he had some doubt about this plant's belonging to Hydrophyllaceæ and expressed his desire to study it, asking me to send him the materials. This being done, he soon published his paper on *Ellisiophyllum*[2] in which he expressed the opinion that BAILLON's statement, to which I have referred above, was correct. According to his opinion, all the Hydrophyllaceous plants have, without

1) MAKINO, T. in Tōkyō Bot. Mag. XX. p. 92. t. V.

2) BRAND, A.—Ellisiophyllum, in "Zwei Kritischen Pflanzen Gattungen," p. 5.

exception, two parietal placentæ, which connate themselves in the innerside of the capsules. But, it is quite otherwise with the present plant, which bears only a placenta rising by itself to midway from the base of the ovary, i.e. a central placenta, as is the case with Scrophulariaceous plant. The genus is, therefore, not to be referred to Hydrophyllaceæ, but should be referred to Scrophularineæ. There is a little difference between his statement and Mr. MAKINO's drawings, regarding the placenta. So far as I can judge from the latter figures, the ovary is perfectly two-celled, with axial placentæ. But, in the figures given in HOOKER's Icones Plantarum, the ovary is nearly, but not perfectly, two-celled, as the placentæ are free at the apex. Although these differences exist, they are, in my opinion, to be regarded as results of individual mutability, to which all plants are more or less subject. Taking all these things into consideration I think the plant should be referred to Scrophularineæ, as was stated formerly by BAILLON and quite recently by Prof. BRAND. Finally, I may mention one more plant which is also extremely difficult as to its reference. It is *Triplostegia glandulifera* WALL. The genus was first established by WALLICH on a Himalayan plant in his manuscript and also in DC. Mem. VII. t. 4, referring it to Valerianeæ, as we see in "DC. Prodr. IV. p. 642." The genus is, however, transferred to Dipsaceæ by BENTHAM and HOOKER, f. in their Genera Plantarum II. p. 158, with the remark "Genus hucusque ad Valerianeas quibus inflorescentia accedit adscriptum, sed involucellum, semen albuminosum, folia et indumentum omnino Dipsaccarum et odore Valerianearum caret," and also on p. 1230, with another remark, "Stamina perfecta sæpe 3 tantum ut in Valeriana affinibusque, et genus omnino medium tenere videtur inter Valerianeas et Dipsaceas,

etsi characteres essentiales posteriorum." The genus is also referred to Dipsaceæ by HEMSLEY in FORBES and HEMSLEY's Index Flora Sinensis, I. p. 399, and also by F. HŒCK in ENG. u. PRANT. Pfl.-fam. IV.-4 p. 187. When I examined the plant in the Herbarium at Tōkyō, where we have very few Chinese specimens for comparison, I thought that it must be a plant belonging to Valerianeæ, and I saw that the plant was quite referable to the genus *Hœckia*, then newly established by Professors ENGLER and GRÆBNER in DIELS', "Die Flora von Central China."[1] I saw also that the description of *H. Aschersoniana* ENGL. and GRÆBN. accorded fairly well with my plant, though there are some minute points in which they do not exactly agree. As the plants of this family are usually subject to some mutability in the magnitude of flowers and leaves, I thought the present plant to be identical with *H. Aschersoniana*. During my work in the Herbarium at Dahlem, I examined the type of the *Hœckia* and also the specimens of the *Triplostegia* of the Himalayas, and found that they are exactly the same as those with which my plant also is identical. The present plant is, therefore, mentioned, in this work, under the name of *Triplostegia glandulifera* WALL. As to the position of the present genus, it is, in my opinion, much more desirable to refer it to Valerianeæ, than to place it in Dipsaceæ.

I may here mention another remarkable case given in this work. Of all the plants contained in the flora, perhaps the most striking genus is *Oreomyrrhis*, which is all but peculiar to the Australian flora, belonging to Umbelliferæ. The genus is, not only new to the flora of the island, but also new to that of the

1) DIELS, L.—Die Flora von Central China, in ENG. Bot. Jahrb. XXIX p. 598.

northern hemisphere. Another case of novelty is the addition of two families to the present flora. They are Hernandiaceæ and Myristiceæ.

The materials upon which this work is based are, in greater part, the collections made by the Governmental Botanical Survey, supervised by Mr. T. Kawakami, during 1906–1909. I have also referred to a small set of specimens of Loo-chooan plants, collected by Mr. G. Nakahara, a few dubious specimens from the Loo-choo and Bonin islands, preserved in the Herbarium at Tōkyō, and small collections of Formosan plants sent by Mr. S. Nagasawa and the late N. Konishi.

The present work was, in great part, carried out by myself in the Herbarium at Kew. A few families were examined by the staff of the same laboratory. Of the staff, I may mention Dr. O. Stapf for doubtful families, Mr. E. N. Brown for Asclepiadeæ and Aroideæ, Mr. R. A. Rolfe for Umbelliferæ and some Orchids.

In conclusion, I must tender my hearty thanks to Prof. J. Matsumura for his encouragement during the present work. I also wish to express my sincere gratitude to Mr. K. Oshima, Ex-Chief of Civil Government of Formosa, by whose graciousness extended towards myself, I was able to visit the principal herbaria of the West. To Lieut. Col. D. Prain, Director of the Royal Botanic Gardens, Kew; to Monsieur le Prof. Dr. H. Lecomte, Directeur de la Galerie de Botanique du Muséum à Paris; to Herrn Prof. Dr. A. Engler, Direktor des Kgl. Botanischen Gartens und Museums zu Dahlem, and to Monsieur le Prof. Dr. A. A. Fischer von Waldheim, Directeur du Jardin Impérial de Botanique à St. Pétersbourg, I am also greatly indebted for permission to work in their herbaria. My very cordial thanks are also due to Dr.

O. STAPF, keeper of the Herbarium at Kew, for his constant kindness during my stay at Kew, to Mr. C. H. WRIGHT for his assistance in determining plants, especially, Palmæ; to Mr. N. E. BROWN for Asclepiadeæ, and Aroideæ; to Mr. R. A. ROLFE for Umbelliferæ, and Orchideæ, to Mr. S. A. SKAN for his advice in the library; to Mr. T. A. SPRAGUE for Celastrineæ; to Messrs. W. B. HEMSLEY and J. G. BAKER for their valuable advice; to Dr. A. HENRY for his kindness in helping me to see LINDLEY's Herbarium in Cambridge; to Mr. S. T. DUNN for *Carices*, to Monsieur F. GAGNEPAIN for his assistance in my work in the Herbarium at Paris; to Herrn Dr. R. PILGER, and Herrn Dr. R. SCHLECHTER for their cordiality during my stay at Dahlem; and to Monsieur W. L. KOMAROW, for a seat given to me in the Herbarium at St. Petersburg. Finally, I sincerely desire to express my cordial gratitude to Monsieur J. PALIBIN, Conservateur du Jardin Impérial de Botanique à St. Pétersbourg, for his kindness in entertaining me at his house, during my stay in the capital and in placing at my disposal all facilities for my work. To Mr. T. KAWAKAMI who has put all the Governmental collections at my disposal, to Messrs. Y. SHIMADA, U. MORI, S. SASAKI and all other collectors, I wish to tender my sincere thanks.

B. HAYATA.

Tōkyō, 13, February, 1911.

Materials for a Flora of Formosa.

Dicotyledones.

Polypetalæ.

Ranunculaceæ.

Clematis Linn.

Clematis akoensis Hayata sp. nov. Caulis glaber, foliis 15 cm. a se remotis. Folia trifoliolata crassiuscula, petiolata, petiolis 5 cm. longis, foliolis cordato-ovatis, 3 cm. longis, sæpe præter costas plicatis, apice acutis reflexis glabris, petiolulatis, petiolulis 1.5 cm. longis. Flores axillares, solitarii vel paniculati, paniculis pauci-floratis, longe pedunculatis, pedunculis 7 cm. longis, apice incrassatis prope basin 2-bracteatis, interdum ebracteatis, bracteis minutis spathulatis obtusis 1 cm. longis. Flores apertientes 4.5 cm. in diametro. Sepala 6, extus dense et brevissime velutina, margine conduplicato-reflexa, intus glabra, crassiuscula, oblonga, 23 mm. long, 8 mm. lata, apice obtusa. Stamina ∞, in longitudine sepalum $\frac{1}{2}$-plo æquantia, antheris apice connectivis obtusis productis. Achænia barbata, barbis albis.

Hab. Akō; Miharashi-tōge, leg. J. Kawakami et U. Mori, Aprili. 1907, (Fl.)

The present plant is very like, or perhaps the same plant as, Henry's specimen No. 1320 labelled *C. parviloba*. The type of *C. parviloba* is quite different from our plant and also from Henry's specimen, in having hirsute sepals, much thinner and less glabrous leaves.

Clematis boninensis HAYATA sp. nov. Caulis glaber vel paucissime pubescens, striatus, foliis a se 11-12 cm. remotis, ramis divaricatis, tenuibus. Folia longe pedunculata, elongato-oblonga, vel ovata, obtusa vel obscure acuta, crassiuscula, basi rotundata, tum subito angustata, ad petiolum abeuntia, 7-4 cm. longa, 3-2 cm. lata, 5-nervia, integra. Flores laxe corymbosi, corymbis pauci-floratis vel interdum in florem unicum reductis. Flores 4 cm. in diametro. Sepala spathulata 2.5 cm. longa 8 mm. lata, apice obtusa, basi angustata, ad marginem brevissime tomentosa. Stamina ∞ , antheris apice truncatis filamentis filiformibus. Achænia sub maturitate oblique ovata, acuta complanata pubescentia, obscure rostrata, 8 mm. longa, 4 mm. lata, caudis reflexis, 3 cm. longis, longe barbatis, barbis albis transverse patentibus, 5 mm. longis.

HAB. Bonin : Chichijima, leg. OKADA, Nov. (Fr. et fl.)

Mostly like *C. paniculata*, but differs from it by the larger flowers and longer leaves. The flowers are twice as larger than those of *C. panisulata*. The plant is not represented at Kew. The leaves have five-nerves at the base ; three of them are very conspicuous, while the other two are very slender.

Clematis chinensis RETZ. ; DC. Prodr. I. p. 3 ; FORBES in Journ Bot. (1884) pp. 262 et 265 ; FORBES et HEMSL. Ind. Fl. Sin. I. p. 3 ; DIELS Fl. Centr. Chin. in ENGL. Bot. Jahrb. XXIX. p. 332 ; MATSUM. et HAYATA Enumeratio Plantarum Formosanarum, p. 4 ; FINET et GAGNEPAIN, Contrib. Fl. Asi. Orient. p. 20.

Clematias minor DC. ; LOUR. Fl. Cochinch. ed-WILLD. p. 422 ; FORBES, in Journ. Bot. (1884) p. 263.

Clematis Benthamiana HEMSL. in FORBES et HEMSL Ind. Fl. Sin. I. p. 2.

HAB. Taitō : Taiharō, leg. T. KAWAKAMI et G. NAKAHARA, Jan. 1906, (No. 680).

DISTRIB. Southern and Central China.

OBSERV. Plant slender, pubescent; internodes 8 cm. long; leaves trifoliolate, about 10 cm. long, petioles 4 cm. long, twining, petiolules almost equal 8 mm. long, leaflets cuspidato-lanceolate the terminal one 6 cm. long, 1 cm. broad much larger than the lateral ones, margin entire, with three distinct and two obscure nerves, veins impressed on the surface, prominent beneath scarcely hairy, turned black when dried; achenes flattened ina dry specimen, with two ridges, ovate, 2 mm. broad, hairy, tails 2 cm. long with soft hairs; somewhat resembles *C. formosana* O. KUNTZE.

Clematis crassifolia BENTH. Fl. Hongk. p. 7; KUNTZE, Monog. Clemat. p. 152; FORBES et HEMSL. Ind. Fl. Sin. I. p. 3; FINET et GAGNEPAIN, Contrib. Fl. Asi. Orient. p. 16.

HAB. Shintiku, Goshōrin, leg. T. KAWAKAMI, Dec. 1905, (No. 1245).

DISTRIB. Central and Southern China. New to the Formosan flora.

OBSERV. Rather stout, glabrous, climbing plant; leaves fleshy, trifoliolate, leaflets elliptical, obtuse or acute, narrowed at the base, nerves very obscure, reddish brown when dried; sepals angustate with white hairs on the margin, 18 mm. long; stamens 1 cm. long, with brownish undulated filaments; anthers oblong, not mucronate, five times shorter than the filaments; achenes long hairy, with hairy tails; remarkable for its undulate filaments.

Clematis Leschenaultiana DC. "Syst. I. p. 451;" KUNTZE, Monog. Clemat. p. 167, (*C. acuminata* δ.); FINET et GAGNEPAIN Contrib. Fl. Asi. Orient. p. 27.

Clematis Wightiana? HAYATA Fl. Mont. Formos. p. 43.

Hab. Kachinro, leg. C. Owatari, Mart. 1898; Taitō, Iriyo-kukaku, leg. T. Kawakami et U. Mori, Dec. 1905 (No. 2149); Niki et Suichōriu, leg. C. Owatari, Jan. 1898.

Distrib. China and Indo-China.

Observ. Covered by yellowish soft hairs; leaves trifoliolate, petioles 5 cm. long, leaflets ovate acute 8 cm. long, 3½ cm. broad, obscurely dentate or nearly entire, lateral leaflets oblique at the base; panicles few-flowered, peduncles 4–5 cm. long; sepals 4, ovate, nearly acute, with yellowish soft hairs on the outside, glabrous inside; stamens many, 12 mm. long, filaments hairy on the margin and outside, quite glabrous on the inside, anthers narrow, glabrous; achenes hairy, fusiform with two distinct ridges, tails with long hairs.

In my Flora Montana Formosæ, I doubtingly referred this plant to *C. Wightiana*. After examining more carefully, I have found that the specimen is the same as the Philippine form of *C. Leschenaultiana* DC. The present plant differs from *C. Wightiana* in having fusiformed achenes and thread-like filaments. *C. Leschenaultiana* described in Kuntze's "Monog. Clemat. p. 167," has lanceolate leaves, while the Formosan plant has ovate ones.

Clematis Leschenaultiana DC. var. **angustifolia** Hayata n. v. Caulis striatus atro-purpureus tomentosus vel pubescens. Folia trifoliolata, parce tomentosa, foliolo terminali oblongo-lanceolato acuminato basi acuto vel rotundato 7–8 cm. longo, 2½ cm. lato, remote serrato ad acumen integro, petiolulo 1 cm. longo, foliolis lateralibus oblongo-ovatis acutis basi oblique rotundatis, petiolis foliorum 6 cm. longis. Flores sæpe solitarii, vel paniculati, paniculis 2-3-floratis, pedunculis flavo-tomentosis. Achænia fusiformia rostrata, caudis

longis barbatis, barbis transverse patentibus, flavescentibus.

Hab. Shinkō: Rahao, leg. T. Kawakami 1908.

Differs from the type in having much narrower leaves.

Clematis longisepala Hayata Fl. Mont. Formos. p. 41.

Hab. Bankingsing: Dr. A. Henry, No. 846, (herb. Kew.)

Clematis Owatarii Hayata sp. nov. Caulis gracilis striatus, glaber, internodiis 14 cm. longis. Folia pinnata, foliolis 3-5, rotundato-ovatis vel triangulari-ovatis, apice rotundatis vel emarginatis basi truncato-rotundatis, ad extremitatem subito acutis 4 cm. longis, 3½ cm. latis, glabris, integerrimis, petiolis 6 cm. longis, petiolulis 1½ cm. longis. Flores axillares solitarii, longe pedunculati, pedunculis 7 cm. longis apice incrassatis, basi 2-4-bracteatis, bracteis minutis, spathulatis, vel ovatis. Achænia complanata, barbata, caudis 5 cm. longis, barbatis, barbis transverse patentibus, 4 mm. longis, albis.

Hab Formosa, leg. C. Owatari.

The present plant differs from *C. recta* and also from *C. paniculata* in having longer tailed fruit and much more rounded leaves. The leaves have generally three leaflets, or sometimes five-leaflets, then the distance from the first pair to the second pair is nearly as long as the petioles.

Clematis taiwaniana Hayata sp. nov. Pubescens, caulibus striatis. Folia tripartita vel bi-trifoliolata, triangularia, 20 cm. longa, totiusque lata, petiolis 12 cm. longis, pinnulis ovato-cordatis cuspidatis grosse-dentatis, utraque pagine pubescentibus. Paniculæ axillares, 15 cm. longæ, 7 cm. latæ, pubescentes v. tomentosæ. Flores minores circ. 1 cm. in diametro, 8 mm. longi; sepalis 4, ovatis v. spathulatis obtusis, extus pubescentibus intus glabris, staminibus 2-3-seriatis, filamentis dilatatis, antheris

oblongis ; achænia pubescentia, stylis longe barbatis, barbis albis.

Hab. Taichūcho ; Daibōho, leg. T. Kawakami et U. Mori, Aug. 1904, (No. 229) ; Biōritsu : Taiko, leg. T. Kawakami et U. Mori, Aug. 1908 (No. 73) ; Taihoku : Shizangan, leg. T. Kawakami et S. Sasaki, Juni. 1908.

The commonest species of *Clematis* in Formosa ; the leaves of the plant are extremely variable. It comes near *C. triloba* Hook ; but differs from it in having leaves grossly dentate or incisely lobed. Also it is very like *C. Vitalba* Linn. var. *javanica* O. Kze., from which it is distinguishable by its more rounded fruit.

Clematis paniculata Thunb.

Hab. Garanbi : Koshūn, leg. T. Kawakami, Juli. 1906, (No. 1620).

Distrib. Japan, China and Korea.

Exactly the same as Chinese specimens at Kew, labelled *C. paniculata* but a little different from Japanese specimens preserved in the Tōkyō Herbarium.

Clematis uncinata Champ. in "Kew Journ. Bot. III. p. 255"; Benth. Fl. Hongk. p. 6 ; Maxim. Mél. Biol. IX. p. 597 ; Forbes et Hemsl. Ind. Fl. Sin. I. p. 7 ; Finet et Gagnepain, Contrib. Fl. Asi. Orient. p. 8.

Cl. leiocarpa Oliv. in Hook. Ic. Pl. t. 1533.

Var. **floribunda** Hayata n. v. Glabra, subnigricans in exsiccato, internodiis 12 cm. longis. Folia 5-foliolata subcoriacea circ. 20 cm. longa, foliolis ovato-lanceolatiis acuminatis, basi rotundatis 11 cm. longis, 3½ cm. latis, 3-nerviis supra subtusque prominentibus. Paniculæ axillares 30 cm. longæ, 15 cm. latæ, ramosissimæ, bracteis subulatis. Flores minores 1½ cm. in diametro æquantes ; sepalis

4, lanceolatis aristatis, 1 cm. longis $2\frac{1}{2}$ mm. latis, margine albo-lamellatis, extus intusque glabratis ; staminibus 2-3-seriatis intimis longioribus 6 mm. longis, filamentis nigricantibus, antheris angustis connectivis latioribus productis achænia subglabrata ovata, stylis longe barbatis, barbis rubris.

Hab. Taiko, leg. T. Kawakami, Aug. 1908, (No. 58).

The present variety differs from the type in having much smaller flowers, ovate-lanceolate leaves, and not leafy inflorescence. It resembles the type in stamens and achenes, and especially in glabrous sepals turning black when dried. The type has usually larger flowers, with sepals twice as longer as that of the variety, and longer, looser, and less flowered inflorescence, with longer peduncles. The present variety is represented at Kew by a specimen from Hongkong, which is labelled *C. uncinata*, but is different from the type of the species mentioned.

Ranunculus Linn.

Ranunculus Kawakamii Hayata sp. nov. Herba perennis, tenuis, 7 cm. alta, hirsuta, pauci-ramosa. Folia radicalia fasciculata, longe petiolata, petiolis 4-5 cm. longis, hirsutis vel subglabris, basi dilatatis stipulam squamosam formantibus, laminis semi-orbicularibus, vel rhomboidalibus, apice rotundatis vel obtusis brevissime 5-lobatis, (lobis obtusis), inferiore integris basi acutis, truncatis, interdum reniformibus vel cordatis, prope marginem hirsutis, 10 mm. longis, 12 mm. latis. Folia caulina minora, hirsuta, petiolis basi dilatatis amplexicaulibus. Flores ad apicem ramorum solitarii, vel axillares, pedunculis 1 cm. longis hirsutis ; flores apertientes 5 mm. in diametro. Sepala 4-5, rotundata, valde concava apice bifida vel rotundata, 2 mm. longa extus pilosa. Petala 3-5, alba,

oblonga apice rotundata, 4 mm. longa. Stamina circ. 10, 1½ mm. longa, antheris oblongis apice rotundatis, filamentis complanatis basi plus minus brevissime hirtellatis. Carpella circ. 10. Syncarpium globosum.

Hab. Kagi : Arizan, ad 7000 ped. alt., leg. T. Kawakami et U. Mori, (No. 3646).

The present plant appears very near to *R. Cymbalaria* Pursh and also to *R. flaccidus* ; but differs from the former in the shape of the flowers and especially in having very few carpels, and from the latter in the hairy form of the plant.

Ranunculus taisanensis Hayata sp. nov. Perennis ; caulis ascendens, hirsutus, pauci-ramosus, 14 cm. longus. Folia radicalia, longe petiolata, hirsuta, petiolis 4 cm. longis basi dilatatis caulem amplectantibus, laminis late orbicularibus, 3-lobatis, lobis rotundato-rhomboidalibus, leviter lobulatis vel irregulariter serratis basi truncato-cordatis, apice subrotundatis. Folia caulina iis radicalibus conformia, petiolis basi dilatatis, caulem amplectantibus. Folia superiora trilobata, lobis acutis. Paniculæ pauci-floratæ vel ad florem unicum reductæ, bracteis minutis, lanceolatis, 2 mm. longis, pedunculis 1½ cm. longis, floribus apertientibus. 7-8 mm. in diametro. Sepala 5, oblongo-elongata, apice obtusa, vel rotundata, 3½ mm. longa, 1 mm. lata, dorso hirsuta. Petala 5-10, obovata, cuneata apice rotundata, basi cuneata, 4 mm. longa, 2 mm. lata basi distincte glandulifera. Stamina circ. 20, 2 mm. longa, antheris rotundatis apice emarginatis, filamentis plus minus complanatis ; carpophorium oblongo-cylindraceum. Carpella numerosa. Achænia oblique rotundata, 1⅓ mm. longa, rostrata, rostris brevissimis, facie minute punctata.

Hab. Biōritsu : Rokujiō-taisan, ad 8000 ped. alt., leg. T. Kawakami et U. Mori.

Near *R. philippinensis* Merr. et Rolfe ; but differs from it by the much smaller flowers and more rounded leaves.

Ranunculus sp.

Hab. in Monte Morrison, ad 10000 ped. alt., leg. T. Kawakami et U. Mori, 1906, Oct.

Observ. Apparently perennial with long fibrous roots. Stem slender hirsute, branchless, with a solitary flower. Radical leaves long petiolate, petioles 6 cm. long, slender, nearly glabrous or thinly hairy, blades rounded in outline, 3-5-lobed towards the apex, somewhat thick nearly glabrous or hirsute. Cauline leaves 1 at the middle portion of the stem, subsessile, deeply 3-lobed, lobes lanceolate, obtuse or acute, hirsute. No flowers ; indeterminable. There is something like this at Kew, labelled *Ranunculus philippinensis* Merr. et Rolfe. Without examining its flowers, it is difficult to say whether our plant is identical with the Philippine plant or not.

Isopyrum Linn.

Isopyrum adiantifolium Hook. et Thoms. var. **arisanensis** Hayata n. v. Rhizoma repens, caulis erectus, tenuis, gracilis 1 mm. in diametro, striatus, subglaber, inferiore aphyllus cramosus, superiore furcatus, vel bi-furcatus, pauci-foliatus. Folia radicalia fasciculata, cum petiolis 4-5 cm. longa, petiolis 3-4 cm. longis, tenuibus, basi stipulatis, stipulis semi-orbicularibus 4 mm. longis cum petiolis connatis, squamosis, laminis bi-tri-pinnatis, pinna terminali semper simplici, cum petiolulo 12 mm. longa, flabelliformi-semiorbiculari, leviter lobulata, basi truncato-acuta,

integra, 7 mm. longa, 8 mm. lata, tenui, pinnis lateralibus sæpe pinnatis cum petiolulis 12 mm. longis, pinnulis lateralibus pinnatis, pinnula terminali simplici pinna terminali conformi. Folia caulina ad ramificationem 2, opposita, minora ternate vel bi-ternate pinnata. Flores dichotome-cymosi, pedicellis 8 mm. longis. Sepala 5, oblongo-ovata, 4 mm. longa, apice obtusa. Petala 5, brevissima nectariformia stipitata, cum stipitibus 1 mm. longa, laminis rotundatis ½ mm. longis, obtuse mucronatis, intus ad basin laminæ glanduliferis. Stamina 5, filamentis 2½ mm. longis complanatis, antheris oblongo-orbicularibus sæpe incurvis. Carpella 2, libera, sessilia, lunaria, 3 mm. longa, ½ mm. lata, stylo brevissimo, ⅓ mm. longo, stigmate truncato. Folliculi divaricati elongati, 9 mm. longi, 2½ mm. lati, basi connati, apice truncati dorso virides, facie flavescentes. Semina circ. 10, globosa, ¾ mm. in diametro dorso leviter carinata, fusco-flavescentia, glabra.

Hab. Arizan, leg. T. Kawakami, et U. Mori, Mart. 1908.

Near *I. adiantifolium* Hook. f. et Thoms. ; but differs from the type in having much smaller flowers and shorter leaves.

Magnoliaceæ.

Illicium Linn.

Illicium sp. Hayata Fl. Mont. Formos. p. 45.

Hab. in montibus centralibus, ad 8000 ped. alt., leg. U. Mori Nov. 1906, (No. 1918).

Very like *Illicium Griffithii* ; no flowers, indeterminable.

Anonaceæ.

Uvaria Linn.

Uvaria sp. Scandens ; folia angusta v. obovato-angusta,

apice abrupte acuta basi acuta, 20 cm. longa, 6 cm. lata, subtus glauca, costis et venis prominentibus.

Hab. Mt. Chōran, leg. G. Nakahara, Aug. 1905, (No. 270).

Observ. A large twining plant; near *U. clusiflora* Merrill, of the Philippines.

Menispermaceæ.

Stephania Lour.

Stephania tetrandra Moore; Matsum. et Hayata Enum. Pl. Formos. p. 16.

Hab. Tamsui, leg. B. Hayata, 1908.

Distrib. East China.

Observ. Caulis lignosus volubilis striatus, glaber. Folia reniformia, irregulariter repundata, vel integra, apice subito acuta, ad summum obtusa, et mucronata, basi reniforme-cordata, peltata, (sinibus rotundatis) glabra, subtus glauca, chartaceo-membranacea, 7 cm. longa, 8 cm. lata, petiolis gracilibus striatis 6 cm. longis, prope basin laminarum insertis. Paniculæ superaxillares petiolum in longitudine æquantes, pubescentes; flores ad apicem ramorum panicularum capitatim et umbellatim dispositi, pedicellis brevioribus, 4 mm. longis. Drupæ compresso-globosæ, 5 mm. in diametro, glabræ.

Near *Stephania dahurica* DC. and also *S. hernandifolia*; but differs from the former in having nearly rounded, but not lobed, leaves, and from the latter in roundly sinuated base of the leaves. In *S. hernandifolia*, the sinus at the base of the leaves is acute but not rounded.

Sp. Suffrutex, scandens, tomentosus. Folia alterna, ovata vel elliptica, obtuse acuminata, breve petiolata, 7 cm. longa, 4 cm.

lata, supra glabra, subtus hispido-tomentosa, costis venisque prominentibus, margine integra. Racemi pauci-florati, axillares.

OBSERV. Very interesting plant. This is the only shrubby plant belonging to this family from Formosa.

Berberideæ.

Berberis LINN.

Berberis Kawakamii HAYATA sp. nov. *Berberis* sp. HAYATA Fl. Mont. Formos. p. 48. Frutex erectus ramosissimus, ramulis angulatis sulcatis, spinis ternatis 2-3 cm. longis. Folia fasciculata coriacea obovata oblanceolata vel lanceolata acuta basi cuneata subsessilia remote spinuloso-dentata 5-3 cm. longa, 2-1 cm. lata, venis supra impressis subtus prominulis, venulis utraque pagine prominentibus, subtus pallidiora. Flores 10-15 fasciculati basi fasciculorum perulati, perulis 2-3-seriatis, squamosis, late triangularibus brevissime aristatis, pedicellis inclinatis, 1 cm. longis. Sepala 5-6, inæqualia, lanceolata acuminata vel subulata, petalum superantia, extimis minimis. Petala 5-6, oblongo-rotundata, $4\frac{1}{2}$ mm. longa, obtusa vel rotundata, basi intus 2-glandulifera. Stamina 5-6, $2\frac{1}{4}$ mm. longa, filamentis $1\frac{1}{4}$ mm. longis incrassatis, antheris 1 mm. longis oblongis, connectivis leviter productis truncatis. Carpellum breve cylindraceum 3 mm. longum, stigmate sessili peltato. Baccæ 5-10-fasciculatæ, nigricantes, oblongo-ovoideæ, 7 mm. longæ, utrinque obtusæ, 2-3-spermæ, seminibus lunaribus, curvis, 5 mm. longis, minute rugulosis fuscentibus, pedunculis 1 cm. longis.

HAB. in monte Morrison, ad 9000 ped. alt., leg. T. KAWAKAMI Oct. 1906, (No. 1941).

The present plant comes very near *B. barandana* VIDAL ; but differs from it in having much shorter peduncles and especially in

the number of ovules contained in ovaries. *B. barandana* has one ovule while our plant has always two or sometimes three ovules. It also bears some resembrance to *B. xanthoxylon* Hask. and *B. Wallichiana*, but differs from both in having more sparely serrated leaves, and especially from the latter by its much more rounded fruit.

Berberis morrisonensis Hayata sp. nov.

Berberis sp. Hayata Fl. Mont. Formos. p. 47.

Frutex erectus ramosissimus, ramulis spinis ternatis, Folia fasciculata coriacea, ovata spathulatave, apice rotundata aristato-mucronata vel obtusa margine remote spinuloso-dentata, basi cuneata sessilia vel breve petiolata, 15 mm. longa, 7. mm. lata. Baccæ 3-fasciculatæ, globoso-ellipsoidales, utrinque obtusæ, rubræ, 9 mm. longæ, 3-spermæ, stigmatibus parvis sessilibus, seminibus lunaribus, 4 mm. longis, lævibus rubro-puniceis, pedunculis 1½ cm. longis.

Hab. in monte Morrison, leg. T. Kawakami et U. Mori, Oct. 1906, (Nos. 2289 et 2297).

Near *B. dictyophylla* Franch.; but differs from it in having 3-fasciculate fruits which are much more round than that of Franchet's species.

Nymphæaceæ.

Brasenia Schreb.

Brasenia purpurea Casp.; "in Jorn. Sc. Acad. Lisb. IV. p. 312."

Hydropeltis purpurea Richard; DC. Prod. I. p. 112.

Brasenia peltata Pursh.; Hook. f. et Thoms. in Hook. f. Fl. Brit. Ind. I. p. 113; Franch. et Sav. Enum. Pl. Jap. I. p. 25.

Hab. Giran: Kentōzan, leg. T. Kawakami et U. Mori, Juni. 1906, (No. 1341).

Distrib. New to the flora of Formosa ; commonly found in Japan, distributed in eastern North America and eastern Australia. Not yet known from China.

Observ. Flowers solitary, sessile, or pedunculate ; leaves peltate, elliptical, 10 cm. long, 6.5 cm. broad.

Papaveraceæ.

Corydalis DC.

Corydalis formosana Hayata sp. nov. Herba majuscula, 40-50 cm. alta, ramosissima, glaberrima, caulibus sulcatis flexuosis. Folia caulina cum petiolis 15 cm. longa, 7 cm. lata bipinnata, petiolis 4 cm. longis, pinnis remotis, ovatis 5 cm. longis 3 cm. latis, petiolulis 2 cm. longis, pinnulis subsessilibus, obovatis, trilobatis vel irregulariter lobulatis apice rotundatis, lobulis obscure mucronatis. Racemi 13 cm. longi, pedunculis 4 cm. longis, bracteis ovatis acutis 4 mm. longis, pedicellis 4 mm. longis. Sepala mimutissima oblique rotundata, obtusa, 1½ mm. longa, basi rotundata. Petala exteriora dissimilia, altero cum calcari 17 mm. longo, 4 mm. lato, apice patente emarginato leviter mucronato, dorso prope apicem alato, (ala 2 mm. longa 1½ mm. lata), basi calcarato, calcari 4 mm. longo 2 mm. lato, prope apicem abrupte recurvato, apice rotundato ; altero angustato 12 mm. longo, 2 mm. lato, versus apicem dilatato, rotundato, leviter emarginato dorso prope marginem alato, alis triangularibus 1 mm. latis ; interiora angustissima 12 mm. longa ungulata, unguibus 5½ mm. longis, ½ mm. latis, laminis oblique quadrangularibus 6 mm. longis 2½ mm. latis, apice rotundatis emarginatis, mucronatis, prope apicem dorso alatis, alis leviter productis 1 mm. latis. Stamina 12 mm. longa, filamentis complanatis, 1½ mm. latis, sursum gradatim

angustatis. Capsulæ lineares cum rostris 2½ cm. longis 4 mm. latis, apice rostratæ, rostris 6 mm. longis. Semina orbicularia compressa, minute et elegante circus centrum punctata, 1½ mm. in diametro, arillis suborbicularibus 1½ mm. longis.

Hab. Taitō; Taruko, leg. G. Nakahara, 1906, Juni. (No. 710).

Very near *C. Balansæ* Prain; but differs from it in having larger flowers and very much smaller bracts.

Corydalis kelungensis Hayata sp. nov. Herba tenuissima 30 cm. alta, ascendens, glaberrima. Folia radicalia longe petiolata, multiplo-ternata, cum petilolis 30 cm. longa, petiolis gracilibus 15 cm. longis, longe petiolulata, pinnulis obovatis 2 cm. longis 1 cm. latis apice rotundatis vel 2-3 lobatis basi gradatim angustatis ad petiolulum abeuntibus, subtus pallidioribus. Racemi 10 cm. longi, laxe-florati, bracteis ovatis 5 mm. longis, pedicellis 1 cm. longis. Flores circ. 18 mm. longi. Sepala 2, caducissima, non visa. Petala 4, inæqualia, horizontaliter conniventia, exteriora altero majore naviculari cum calcare 18 mm. longo, basi calcarato, (calcari 9 mm. longo, 3 mm. lato recto apice obtuso recto vel leviter curvo); altero plano 13 mm. longo basi longe unguiculato, lamina rotundata 7 mm. lata apice emarginata vel sinuato, basi gradatim angustata ad unguem abeunti; interiora cohærentia, angusta dorso apice valde carinata, 13 mm. longa. Genitales non visæ.

Hab. Kelung: Arikō, leg. T. Kawakami et Y. Shimada, 1908 Mart. (No. 4298).

The flowers are somewhat like those of *C. decumbens* Pers., but the leaves are quite different.

Corydalis taitœnsis Hayata, sp. nov. Herba humilis perennis 8 cm. alta, radicibus fibroso-crassiusculis. Folia radicalia bi-

pinnata, cum petiolis 8 cm. longa, glabra, in circumscriptione ovata, petiolis 4 cm. longis basi gradatim dilatatis, plus minus incrassatis, pinnis remotis cum petiolulis 2 cm. longis, 1 cm. latis, pinnulis obovatis, 3-lobatis vel-lobulatis, sessilibus, lobulis obscure mucronatis. Folia caulina iis radicalibus conformia. Racemi 5-8 cm. longi, bracteati, densiuscule florati, bracteis obovatis obtusis 5 mm. longis $2\frac{1}{2}$ mm. latis, pedicellis 6 mm. longis. Sepala 2, minuta, caducissima, oblique rotundata $1\frac{1}{2}$ mm. in diametro, erregulariter dentata, basi rotundata, peltatim vel cordatim affixa. Petala 4, exteriora altero basi calcarato, cum calcare 18 mm. longo 5 mm. lato erecto vel leviter recurvato apice truncato brevissime calloso-mucronato marginato, prope apicem leviter concavo-excavato, altero angustato 13 mm. longo, 3 mm. lato, apice truncato et carnoso mucronato prope apicem giboso, interiora angusta longe unguiculata, cum unguibus 13′ mm. longa, unguibus 7 mm. longis, laminis angustatis obliquis basi leviter auriculatis 7 mm. longis, $2\frac{1}{2}$ mm. latis, apice truncatis carnoso-mucronatis, dorso carinatis, carinis apice leviter productis, $1\frac{1}{2}$ mm. latis. Filamenta 12 mm. longa 2 mm. lata, complanata versum apicem angustata.

HAB. Taitō : Daironkōsha, leg. T. KAWAKAMI, et U. MORI.

Argemone LINN.

Argemone mexicana LINN.; ROXB. "Fl. Ind. II. p. 571;" HOOK. f. et THOMS. in HOOK. f. Fl. Brit. Ind. I. p. 117.

HAB. Taitō : Hinaro, leg. T. KAWAKAMI et Z. KOBAYASHI, Juni. 1906, (No. 1558).

DISTRIB. An American plant ; naturalized in Formosa.

OBSERV. An armed plant ; leaves sessile, oblong, 10 cm. long, 5 cm. broad, dentately incised, aristate on the margin, costs,

and nerves; capsule oblong 5 cm. long, with very many spines on it.

Cruciferæ.

Arabis Linn.

Arabis morrisonensis Hayata sp. nov.

Arabis taraxacifolia Hayata Fl. Mont. Formos. p. 49. (non Anders.)

Herba lignescens, perennis, hirsuta, pilis simplicibus vel ramosis ½ mm.–1 mm. longis, stolonifera, decumbens, caulibus 20 cm. longis, ramosis foliosis. Folia radicalia fasciculata, depresso-radiatim disposita, lyrata, longe petiolata, cum petiolis 3 cm. longa, 6 mm. lata stellato-hirsuta, (pilis furcatis vel simplicibus) spathulata in circumscriptione, petiolis 1½ cm. longis laminam in longitudine æquantibus, laminis longe ovatis lyratis, lobis utraque latere 4-5, lobo terminali obovato-obtuso. Folia caulina simplicia oblanceolata, 3½ cm. longa, 4 mm. lata apice obtusa deorsum gradatim attenuata margine parce remote serrata vel subintegra. Racemi terminales vel axillares 5-6 cm. longi, pedicellis 1-2 cm. longis, bracteis 0. Sepala oblongo-angustata, 2½ mm. longa 1 mm. lata apice rotundata mucronata, dorso paucissime hirsuta. Petala oblongo-obovata ungulata, 6 mm. longa, apice rotundata, vel truncata. Stamina 2 mm. longa. Siliquæ rectæ vel leviter curvæ, lineares 3-4 cm. longæ, 1 mm. latæ, utrinque obtusæ, apice stylis persistentibus, pedicellis 1½ cm. longis. Semina elongato-oblonga 1½ mm. longa ⅔ mm. lata, utrinque rotundata, complanata minute scabriuscula.

Hab. in monte Morrison, ad 13094 ped. alt., leg. S. Nagasawa, Nov. 1905, (No. 680).

In my paper above cited, I mention that the present plant agrees quite well with the description of *Arabis taraxacifolia* ANDERS. given in HOOK. f. Fl. Brit. Ind. I. p. 136, and also very like the European *A. arenosa* SCOP. Although I did not, at that time, see ANDERSON's specimen, I thought that the plant might be identical with *A. taraxacifolia*. While studying here at Kew, I have compared it with the type of the some species and have found that they are quite different. The Formosan plant is distinguishable from the Indian in having nearly erect and stouter pods, larger seeds, and smaller leaves and also in bearing very long stolons. The Indian plant appears to be of more tender habit, with curved pods, narrower, smaller seeds, and larger, thinner leaves. Moreover, the present plant differs from *A. arenosa* SCOP. in having longer pods, smaller flowers, and leaves with more rounded lobes. The description given above is drawn up from a specimen numbered 680, which is of a rather elongate form and prostrate habit.

Cardamine LINN.

Cardamine hirsuta LINN. var. **formosana** HAYATA n. v. Caulis glaber, ramosus, ascendens, 15 cm. altus, foliosus. Folia pinnatisecta, obovata in circumscriptione, cum petiolis 5 cm. longa, 2½ cm. lata, petiolis 2 cm. longis complanatis vel alatis, segmentis lateralibus obovatis apice rotundatis, 3-5 lobulatis, basi subito attenuatis 2½ cm. longis. Racemi 4 cm. longi, pedicellis 1 mm. longis, bracteis obtusis ⅔ mm. longis. Sepala 4, oblonga 1½ mm. longa ⅔ mm. lata. Petala 4, obovata, spathulata 1½ mm. longa, apice rotundata vel emarginata, basi angustata. Stamina 1½ mm. longa, filamentis complanatis. Ovarium cylindraceum 1½ mm. longum. Siliquæ lineares rectæ, 17 mm. longæ 1 mm. latæ,

utrinque obtusæ. Semina oblonga $\frac{2}{3}$ mm. longa minute scabrida.

Hab. Taitō: Hakuhakusha, leg. T. Kawakami, et Z. Kobayashi, 1906, Mai. (No. 1485).

There is a specimen very much like this in the Kew Herbarium. It is labelled *C. hirsuta* Linn. but quite different from the type. As the present plant is quite easily distinguishable from the type of *C. hirsuta* Linn., it is advisable, in my opinion, to regard it as representing a variety of the type, rather than to regard it as a form of it.

Cardamine hirsuta Linn. var. **rotundiloba** Hayata n. v. Herba glabra, caulibus simplicibus 15 cm. longis pauci-foliatis. Folia radicalia pinnata, spathulata in circumscriptione, cum petiolis 6 cm. longa 1 cm. lata, pinnis utraque latere 4-5, remotis subsessilibus rotundatis sæpe obliquis obscure lobatis vel integris, 5-10 mm. longis, petiolis 3 cm. longis complanatis basi leviter dilatatis. Racemi 10 cm. longi, remote florati. Siliquæ lineares rectæ, 22 mm. longæ, 1 mm. latæ, apice obtuso-truncatæ. Semina minute scabrida, oblonga, utrinque rotundata, 1 mm. longa.

Hab. Shintiku: Goshizan, leg. T. Kawakami, (No. 1306).

The present variety is easily distinguishable from the type in having much more rounded lobes of leaflets. There is a specimen very much like this variety at Kew which is labelled *Cardamine hirsuta* Linn. with question mark.

Cardamine reniformis Hayata Fl. Mont. Formos. p. 50.

In my paper above cited, I mention that the plant is somewhat near *C. asarifolia* Linn. from which it is distinguishable by the reniformed or cordate leaves. While studying here at Kew, I have found that the plant is also near *C. violæfolia* O. S. Schutz. from

which it is separable in having rather angulate leaves and very much smaller flowers. Flowers of my plant are 3 mm. long, while those of the Chinese *C. violæfolia* are 8 mm. long, or even more. Those of *C. asarifolia* LINN. are also much larger.

Senebiera POIR.

Senebiera integrifolia DC.; MATSUM. et HAYATA Enum. Pl. Formos. p. 25.

HAB. Kashiōto, leg. T. KAWAKAMI et G. NAKAHARA, Feb. 1906, (No. 1000); Pratas island, leg. T. KAWAKAMI, Juni. 1908, (No. 11).

DISTRIB. Madagascar, southern Africa, western Australia, Loo-choo islands.

OBSERV. Herb, rather hardy, procumbens, creeping on the basal part, many branched, about 20 cm. high; leaves alternate, spathulate or linear, entire, a little dentate on the upper portion of the margin, 3 cm. long, 4 mm. broad, incurved; racemes terminal, many-flowered, flowers very small; silique didymous laterally compressed, rugosely reticulate; seeds solitary in each cell.

Cochlearia LINN.

Cochlearia formosana HAYATA sp. nov. Herba gracilis tenuis, glabra, 8-10 cm. alta, pauci-ramosa, radicans. Folia simplicia v. trifoliolata, petiolata, foliolis cordatis 2½ cm. longis apice rotundatis emarginatis vel mucronatis, basi reniformibus, margine integris vel remote crenulatis, ad sinus crenarum mucronatis, membranaceis. Racemi subaxillares longe pedunculati pauci-florati. Flores albi minores, 2 mm. longi; sepalis 1½ mm. longis spathulatis; petalis 2½ mm. longis obovatis longe unguiculatis, unguibus ½ mm. longis, staminibus 1½ mm. longis basi glandulis indistinctis; ovarium 2-costatum. Siliquæ sub maturitate horizontaliter divaricatæ, oblongæ

vel elongatæ, 5 mm. longæ subteretes, valvis pubescentibus, concavis, obscure reticulatis. Semina 2-seriata, plurima, oblonga, 1 mm. longa vel longiora, testa rubra, elegante minuteque punctata.

Hab. Shinkō : Remogansha, (No. 1390).

A very pretty herb; the only species belonging to this genus from Formosa. The flowers and fruit of the plant resemble those of *Draba*. But, on account of its being quite glabrous, it should be referred to the present genus.

Capparideæ.

Capparis Linn.

Capparis Henryi Matsum. in Matsum. et Hayata Enum. Pl. Formos. p. 26, t. III.

This is very near *C. micrantha* from which it is distinguishable only in the venation of leaves.

Violaceæ.

Viola Linn.

Viola formosana Hayata in Matsum. et Hayata Enum. Pl. Formos. p. 28.

This is near *V. Sieboldi* Maxim.; but differs from it in having rounded leaves. The leaves of *V. Sieboldi* are much more oblong, but not quite round at the apex, as is the case with the Formosan plant.

Viola Kawakamii Hayata Fl. Mont. Formos. p. 52.

This is near *Viola siamensis* from which it differs in having

much longer spurs. The spurs are usually very short in the Siamese plant.

Pittosporeæ.

Pittosporum BANKS.

Pittosporum formosanum HAYATA, in MATSUM. et HAYATA Enum. Pl. Formos. p. 32, t. IV.

Comes near *P. pauciflorum* HOOK. from which it differs in having very much smaller flowers and ascending or spreading, but not pendulous, peduncles. I have seen at Kew a specimen from Hainan, labelled *P. pauciflorum*. The specimen is quite in accord with the present plant.

Pittosporum daphniphylloides HAYATA sp. nov. Folia petiolata oblonga vel oblongo-oblanceolata apice subito acuta basi abrupte attenuata 15 cm. longa, 4½ cm. lata, margine subintegra vel obscure repandata, coriacea, venis primariis lateralibus utrinque latere 10-15, a costa angulo 60° divaricatis, venulis reticulatis supra impressis subtus leviter elevatis, costis supra impressis, subtus elevatis, petiolis 2½ cm. longis. Racemi ad apicem ramorum fasciculati, paniculati. Capsulæ globosæ, 6 mm. in diametro, apice mucronatæ, 2-valvatim dehiscentes, valvis crassiusculis coriaceis 10-15-spermæ. Semina angulata, compressa, 3 mm. longa, 2½ mm. lata, lævia, rubra.

HAB. Taitō, Dakunsha, leg. T. KAWAKAMI et U. MORI, 1906 Dec. (No. 1839).

This is near *P. floribundum* W. et A.; but differs from it by the fruit and leaves. There is at Kew a specimen exactly like this, labelled *Pittosporum sp.* (China, WILSON, No. 3233).

Pittosporum oligocarpum HAYATA sp. nov. Rami graciles, cinerascentes, ternatim ramulosi. Folia ad apicem ramulorum approximate alterna vel verticillata, breve petiolata, oblonga vel oblongo-lanceolata, apice subito acuminata, basi gradatim attenuata, margine integra vel obscure crenulata, costis supra impressis subtus elevatis venis primariis lateralibus circ. 10, utraque pagine obscure elevatis, venulis reticulatis inconspicuis, chartacea, vel chartaceo-coriacea, petiolis 5 mm.–10 mm. longis. Capsulæ ad axillas foliorum apicalium ramulorum solitariæ, longe pedunculatæ, (pedunculis gracilibus 2½ cm. longis, inclinato-pendulis,) globsæ 7-10 mm. longæ, apice longe mucronatæ, basi abrupte attenuatæ ad stipitem 1-2 mm. longum abeuntes, 2-3 valvatim dehiscentes, 4-5-spermæ. Semina irregulariter angulata, 4 mm. longa, rubra.

HAB. Taito (No. 5837); Biōritsu, Bunsuikei.

Near *Pittosporum pauciflorum* HOOK. et ARN.; but differs from it in having nearly solitary and axillary fruit.

Caryophylleæ.

Cerastium LINN.

Cerastium arisanense HAYATA sp. nov. Herba humilis prostrata, ad nodos radicans, caulibus tenuibus parce hirsutis. Folia opposita petiolata, minora, late rhomboidea, 5-6 mm. longa, 7 mm. lata, apice obtusa et breve aristata, basi late truncata brevissime attenuata, supra margineque ciliata, subtus præter costas glabra, petiolis 6 mm. longis complanatis. Flores circ. 9 mm. longi ad axillas foliorum solitarii, longe pedunculati, pedunculis circ. 5 cm. longis, hirsutis. Sepala 5, lanceolata, 7 mm. longa, 2 mm. lata, squamosa, trinervia, apice acuminata, dorso basin

paucissime hirsuta. Petala 5, obovato-spathulata 12 mm. longa, 4½ mm. lata, apice 2-lobata, (lobis apice rotundatis 2½ mm. longis, 2 mm. latis, sinibus obtusis), basi attenuato-cuneata, unguiculata. Stamina 10. Ovarium ovoideum 2 mm. longum apice truncatum leviter elevatum. Styli 3, erecto-recurvati, 3 mm. longi.

Hab. Arizan. leg T. Kawakami.

Cerastium trigynum Vill. var. **morrisonense** Hayata, n. n.

Cerastium morrisonense Hayata Fl. Mont. Formos. p. 57.

This is quite near *C. trigynum* Vill. from which it is distinguisable only in having much narrower petals. It should better be regarded as a variety of the same species.

Stellaria Linn.

Stellaria micrantha Hayata sp. nov. Herba basi prostrata, ad nodos radicans, internodiis 15 mm. longis, apice ascendens. Folia opposita, sessilia, late ovata, 9 mm. longa, 6 mm. lata, apice aristata, acuta, basi subito attenuata, superiore basi rotundata, plus minus caulem amplectantia. Cymæ terminales vel axillares, 5 cm. longæ 4 cm. latæ, ramis oppositis, bracteis minutis ovatis acutis 1 mm. longis. Sepala 5 oblongo-ovata 2 mm. longa acuta, squamosa. Petala 5, minuta, profunde bifida, lobis lanceolatis 1 mm. longis, sinibis acutis, partibus basilaribus angustatis. Stamina 5. Styli 3, minuti. Capsulæ ovoideæ, ultra medium in valvas 6 integras dehiscentes. Semina compresso-globosa apice brevissime rostrata valde recurvata, facie curvato-reticulata.

Hab. Arizan, ad 8000 ped. alt., leg. T. Kawakami et U. Mori, Mart. 1908, (No. 3584).

Near *Stellaria media* Linn. but differs from it in having extremely small flowers.

Stellaria stellato-pilosa Hayata Fl. Mont. Formos. p. 58, t. II.

This is very near *Stellaria nutans* Hemsl. in Journ. Linn. Soc. XXXIV. p. 434, (Tibet Oriental; Tatsin-Lou); but differs from it by its larger and broader leaves and also in having rough velvety hairs all over the plant. It is also near *S. dichasioides* Williams in the same volume of the same Journal, p. 436, from which it differs in having more hairy leaves. Besides, it comes very near *S. saxatilis* Ham. from which it is hardly distinguishable. All the plants above mentioned are very similar in every respect, and further study will prove that they are one and the same species, though some of them should be regarded as representing a variety of another.

Portulaceæ.

Portulaca Linn.

Portulaca quadrifida Linn. var. **formosana** Hayata v. n. Herba incrassata prostrata, caulibus incrassatis basi 5 mm. in diametro, superiore ramosissimis. Folia alterna crassa, obovata apice rotundata, basi leviter angustata 6-7 mm. longa, 3½ mm. lata, ad axillas fasciculato-pilosa, pilis patentibus 2 mm. longis. Flores ad apicem ramulorum solitarii a foliis verticillatis circ. 5 involucrati. Capsulæ membranaceæ 2½ mm. in diametro. Semina subglobosa ½ mm. in diametro, latere compressa, muriculata.

Portulaca quadrifida Hayata in Matsum. et Hayata Enum. Pl. Formos. p. 39 (non. Linn.)

Hab. Kōtōshō, leg. K. Miyake, Nov. 1899.

Very near the type from which it is distinguishable by its far less hairy form.

Hypericineæ.

Hypericum Linn.

Hypericum acutisepalum Hayata sp. nov. Rami graciles, corticibus rubescentibus, ramulis alternis vel oppositis. Folia opposita, oblonga vel elongato-oblonga, obtuso-mucronata, basi brevissime attenuata, sessilia 3-4 cm. longa, 12 mm. lata, nigro-punctata, subtus pallidiora, venis primariis 5-7, inconspicuis plus minus arcuatis. Flores ad axillas foliorum fasciculati, pedicellati, pedicellis 1 cm. longis, basi perulatis, perulis 2-3-seriatis, subulatis, vel lanceolatis, 1 mm. longis. Sepala 5, inæqualia oblonga acuta $1\frac{1}{2}$ mm. longa. Petala 5, inæqualia oblique obovata, 12 mm. longa, 7 mm. lata, apice truncato-rotundata, basi cuneato-angustata, obliqua. Stamina pentadelpha. Ovarium ovoideum 4 mm. longum apice ad stylum abeuns. Styli ad totam longitudinem connati, 7 mm. longi, apice obscure 5-lobati, stigmatosi.

Hab. Nantō : leg. T. Kawakami, Juli. 1907, (No. 3245).

Near *H. simplicistyla* Hayata ; but differs from it in having much smaller and acute sepals.

Hypericum Nagasawai Hayata sp. nov.

Hypericum attenuatum Hayata Fl. Mont. Formos. p. 59 (pro parte). Caulis gracilis suffrutescens, 7 cm. altus, $\frac{1}{3}$–$\frac{1}{2}$ mm. in diametro, glaber, tetragonus, angulis acutis. Folia opposita, sessilia, oblonga vel oblongo-elongata, apice rotundata, vel obtusa brevissime mucronata, basi breve attenuata, 1–$\frac{1}{2}$ cm. long, 5-6 mm. lata, ad marginem 1-seriatim nigro-punctata, ad paginam pauce pellucido-punctata. Flores ad apicem ramulorum solitarii, pedunculati, pedunculis 6 mm. longis. Sepala 5, elongato-oblonga,

6 mm. longa, 2 mm. lata, apice rotundata vel leviter emarginata margine leviter reflexa ad marginem nigro-punctata, ad paginam pellucido-punctata. Petala 5, oblongo-obovata, obliqua 12 mm. longa, 4½ mm. lata, apice truncato-rotundata, deorsum gradatim angustata, altero latere crassiuscula, altero tenuia. Stamina numerosa, filamentis filiformibus, antheris suborbicularibus ½ mm. longis utrinque emarginatis, dorso apice uni-punctatis, punctis orbicularibus, atro-purpureis. Ovarium oblongo-ovoideum 5 mm. longum 2½ mm. in diametro, 3-sulcatum. Styli 3, distincti, 6 mm. longi.

Hab. Mt. Morrison, ad 13094, ped. alt., 1905, Nov. (No. 754).

In my paper above cited, I mention that the present plant is referable to *Hypericum attenuatum* Choisy., although there have been some doubts about its being identical with Choisy's plant. While studying here at Kew, I have compared the plant with the type of the species, and found that they are so very different that it hardly needs pointing out. The Formosan plant comes very near *H. perforatum;* but differs from it in having obtuse or even rounded sepals. *H. perforatum* has usually very acute sepals.

Hypericum randaiense Hayata sp. nov. Suffrutescens humilis, basi procumbens, sursum ascendens, caulibus gracilibus tetragonis, angulis prominentibus, glabris rubescentibus. Folia opposita sessilia linearia, vel lineari-lanceolata apice truncata brevissime mucronata, 13 mm. longa, 2½ mm. lata, ad marginem pauce nigro-punctata, vel non punctata, ad paginam pellucido-punctata. Cymæ pauci-floratæ, 3-5-floratæ, vel ad florem unicum reductæ, pedicellis 1-2 cm. longis. Sepala 5, lineari-angustata, 5½ mm. longa, 1¼ mm. lata, obtusa, ad marginem 2-3-nigro-punctata, ad paginam pauce pellucido-punctata, vel non punctata. Petala 5, valde oblique obovata, apice rotundata, basi oblique cuneato-acuta, 9 mm. longa,

5 mm. lata. Stamina numerosa, filamentis 6-7 mm. longis, antheris late orbicularibus ½ mm. latis, utrinque emarginatis, apice dorso maculatis. Ovarium ovoideum 3-sulcatum 2½ mm. longum, stylis 3, distinctis 5½ mm. longis.

HAB. Randaizan, leg. U. MORI et B. HAYATA, Aug. 1908, (No. 7108).

This is also very near *H. perforatum* but differs from it in having much obtuse sepals.

Hypericum simplicistylum HAYATA sp. nov. Rami graciles, corticibus subsolutis, rubescentibus, ramulis oppositis, gracilibus. Folia opposita chartacea subsessilia, oblongo-lanceolata, circ. 4 cm. longa, 8 mm. lata, apice acuta vel obtusa, calloso-mucronata, basi leviter cuneata, subtus pallidiora, punctata, costis supra impressis, venis primariis basilaribus 2 arcuatis ad apicem foliorum attingentibus, ad hoc venis primariis 5-7, divaricatis inconspicuis. Flores ad axillas solitarii, oppositi, pedunculati, (pedunculis 1 cm. longis), 2-4-bracteati, bracteis oppositis foliis conformibus sed minoribus, 8 mm. longis, ad basin pedunculorum perulati, perulis squamosis, acutis 1-2 mm. longis. Sepala 3 mm. longa, oblonga, apice obtusa vel rotundata. Petala 5, valde inæqualia oblique oblonga, apice rotundata. Stamina pentadelpha quam petalis breviora. Ovarium 4 mm. longum, ovoideum apice obtusum 5-loculare. Styli ad totam longitudinem connati, stigmatibus subglobosis leviter 5-lobatis. Capsulæ elongato-ovoideæ, 8 mm. longæ, 3½ mm. latæ, stylo 5 mm. longo persistente coronatæ. Semina numerosissima, cylindrico-clavata, 1 mm. longa, unilateraliter alata, alis utrinque leviter productis.

HAB. Nōkōsan, ad 6000 ped. alt., leg. T. KAWAKAMI, et U. MORI, Juni. 1908, (No. 4507).

Near *H. longistylum* Oliv.; but differs from it in the apex of the style and in having smaller flowers, acute and elongate leaves. Also near *H. trinerve* Hemsl. from which it is distinguishable by ovate capsules and elongately oblong leaves.

Hypericum subalatum Hayata sp. nov.

Hypericum formosanum Hayata in Matsum. et Hayata Enum. Pl. Formos. p. 41, pro parte, (non Maxim.)

Rami læves tetragoni, subalati, alis 1mm. latis. Folia opposita, oblongo-lanceolata, 6 cm. longa, 13 mm. lata apice obtusa, vel brevissime mucronata, gradatim angustata, sessilia, punctata. Flores ad apicem ramulorum axillarium solitarii, pedunculati, bracteati, bracteis sæpe 2-3 cm. longis, cum foliis conformibus sed minoribus, ad basin pedunculorum perulati, perulis squamosis lanceolatis 2 mm. longis. Sepala 5, oblonga, 7 mm. longa, 3 mm. lata, obtuso-acuta. Petala 5, valde obliqua. Ovarium ovoideum 5-sulcatum, stylis ad totam longitudinem connatis.

Hab. Kusshaku, leg. U. Faurie, 1903.

The present plant differs from *H. formosanum* Maxim. by much longer leaves. The leaves of the other species are always oblong and shorter than those of this plant.

Hypericum taisanense Hayata sp. nov. Suffrutex, caulis erecto-acsendens, teres rubescens, simplex, eramosus, 30-40 cm. altus, superiore foliosus basi nudus. Folia opposita, elongato-ovata, sessilia, apice obtusa basi cordata, supra ad paginam marginemque punctata, chartacea, costis et venis primariis supra impressis, subtus elevatis. Cymæ terminales 2-4 cm. longæ, 3-4 cm. latæ, bracteis folio minoribus. Sepala 5, basi connata, ovato-lanceolata, obtusa, vel acuta, $2\frac{1}{2}$ mm. longa, punctata, punctis atro-purpureis.

Petala 5, elongato-obovata, 7 mm. longa, 2½ mm. lata, apice rotundato-truncata, interdum leviter emarginata, basi cuneato-angustata, a medio sursum punctato-maculata, punctis linearibus vel orbicularibus atro-purpureis. Stamina 25-30, basi connata, filamentis filiformibus 4-5 mm. longis, antheris late orbicularibus utrinque emarginatis ¼ mm. longis dorso apice maculatis, maculis orbicularibus. Ovarium oblongo-ovoideum 3 mm. longum, 1⅓ mm. latum, 3-sulcatum. Styli 3, distincti 3 mm. longi. Capsulæ elongato-ovoideæ, 1 cm. longæ, 4 mm. latæ apice stylis persistentibus coronatæ. Semina numerosa, breve cylindrica, ⅔ mm. longa, ⅓ mm. lata, utrinque obscure mucronata, sub microscopio elegante muricata.

HAB. Taisan, leg. T. KAWAKAMI.

Near *Hypericum erectum* THUNB.; but differs from it in having elongately ovate leaves.

Ternstrœmiaceæ.

Adinandra JACK.

Adinandra formosana HAYATA in MATSUM. et HAYATA Enum. Pl. Formos. p. 45.

This comes very near *A. Millettii* which has leaves, shining velvety beneath. In the present plant, the leaves are quite glabrous on both sides or slightly pubescent, but never velvety beneath.

Adinandra lasiostyla HAYATA sp. nov. Arborescens? Rami teretes fusco-cineracei, ramulis apicem versus sericeo-tomentosis. Folia oblonga vel lanceolata, 8-10 cm. longa, 2½ cm.–3 cm. lata, breve petiolata, integra vel obscure crenulata, supra glabra,

subtus tomentosa, subcoriacea, petiolis 5 mm. longis. Flores axillares, solitarii, breve pedunculati, pedunculis 8 mm. longis; sepala pilosiuscula, ovata 5 mm. longa; ovarium late ovoideum, stylo piloso.

Hab. Tōzan, in Monte Morrison, leg. G. Nakahara, Oct. 1906; in monte Morrison, leg. T. Kawakami et U. Mori, Dec. 1906. (No. 1944).

Easily distinguished by the leaves which are tomentose underneath. This differs from *A. Millettii* B. et H. which has lanceolate and sericeously barbate sepals.

Adinandra pedunculata Hayata sp. nov. Arborescens? Folia alterna, breve petiolata, obovato-elliptica v. oblonga abrupte acuminata ad sumum extremitatem obtusa, 7-8 cm. longa, 3-2½ cm. lata, margine integra secus apicem serrulata, venis utraque pagine leviter prominentibus, subtus pallida. Flores axillares, solitarii, longe pedunculati, glabri, pedunculis 3-4 cm. longis. Sepala 5, valde imbricata, basi cuneata, ovata, acuta, glabra, crassiuscula, margine ciliolata, coriacea, 8 mm. longa, 6 mm. lata. Petala 5, basi cuneata, ovato-angusta, acuminata, crassiuscula, 10 mm. longa, 3-4 mm. lata, glabra; stamina circ. 30, 8 mm. longa, filamentis geniculatis, pilosiusculis, antheris linearibus pilosis filamento æquilongis, connectivo producto; ovarium 4-loculare late ovoideum pilosiusculum 2½ mm. longum, stylo filiformi glabrato, 8 mm. longo, stigmate obscure 4-lobato.

Hab. Shintiku: Goshizan, leg. T. Kawakami et U. Mori, Juli. 1906, (No. 1353).

Near *A. acuminata*; but differs from it in having glabrous styles and stigmata which are obscurely 4-lobed; also comes near *A. formosana* Hayata; but quite distinguishable by the

larger flowers, numerous (nearly 30) stamens, 4-celled ovary ; from *A. Millettii*, by not velvety leaves which are toothed towards the apex ; also very much like *A. integerrima*, but differs in having much smaller sepals.

Actinidia Lindl.

Actinidia Championi Benth. ; Matsum. et Hayata l.c. p. 47.

Hab. Nantō : Mokuriran, leg. T. Kawakami et U. Mori, Aug. 1906, (No. 1184).

Observ. Leaves large ovate, cordate at the base, glabrous on the surface, densely tomentose underneath, nearly entire or obscurely serrulate ; flowers in cyme, cymes axillary, solitary, peduncles 8 cm. long, with many (nearly 30) flowers ; sepals and ovary tomentose, reddish brown.

Thea Linn.

Thea biflora Hayata sp. nov. Rami fusco-cinerascentes, vel sursum rubescentes. Folia alterna ad ramulos superiores remote disposita, oblonga, 5 cm. longa, 2⅓ cm. lata, apice acuta ad summum extremitatem retusa, basi rotundato-obtusa, margine a medio sursum serrulata, deorsum subintegra utrinque exsiccato pallido-flavescentia, supra costis venis venulisque elevatis, subtus venis et venulis planis inconspicuis, supra ad costas petiolosque breve hirsuta, infra glabra, petiolis 4 mm. longis. Flores ad apicem ramorum geminatim oppositi, sessiles. Alabastrum floris oblongum, sericeo-tomentosum. Sepala 5-8, valde inæqualia, valde imbricata, caducissima, 4-seriatim ad torum 5 mm. longum tomento-hirsutum disposita, late orbicularia dorso medio apiceque dense longeque sericeo-tomentosa, medio coriacea, utrinque tenuia, intus

glabra, extimis minoribus, interioribus majoribus 15 mm. longis 2 cm. latis. Petala 5, inæqualia, exteriora majora obovato-rotundata, apice truncato-rotundata, 2 cm. longa, 1½ cm. lata, extus basi hirsuta, cæterum glabra, interiora angustiora. Stamina numerosa, petalum ½-plo in longitudine æquantia, filamentis ad medium connatis, antheris ovatis, circ. 2 mm. longis, 1⅓ mm. latis, utrinque emarginatis, connectivis plus minus dilatatis. Ovarium ovoideum dense longeque tomentosum, pilis 2 mm. longis erecto-patentibus, stylis 4, ad medium vel ad totam longitudinem leviter connatis, erectis, stigmatibus ad apicem stylorum exteriore sitis oblique truncatis (sulcatis ?).

Hab. Kagi : Kodenshō, leg. T. Kawakami et U. Mori, Oct. 1906, (No. 1758).

There is nothing like this at Kew. I think it may be a species not yet described.

Thea gracilis (Hemsl.) ; Matsum. et Hayata l.c. p. 50.

Hab. Kōshūn : Botansha, leg. G. Nakahara, Dec. 1906, (Nos. 928. et 925).

Observ. Branchlets very slender, pale ; leaves narrow lanceolate caudate or acuminate obtuse at the very apex ; stamens hairy.

Thea lutchuensis (T. Itō), Itō et Matsum. Tent. Fl. Lutch. p. 332.

Hab. Nagodake, leg. G. Nakahara, Aprili. 1907.

This comes very near *Camellia euryoides* Hance, but differs from it by the nearly sessile flowers, more obtuse leaves and 2-lobed stigmata.

Thea shinkœnsis Hayata sp. nov. Rami graciles fuscentes, interdum cinerascentes. Folia versus apicem ramorum disposita, alterna petiolata, oblongo-obovata, 10-12 cm. longa, 3½ cm. lata,

apice subacuta, vel acuminata, ad summum extremitatem obtusa, margine a medio sursum serrata, deorsum integra, basi cuneata, supra venulis reticulatis elevatis, minute elevato-punctata, coriacea, petiolis brevibus 6 mm. longis. Flores ad axillas foliorum apicalium solitarii, breve pedunculati, pedunculis 3-4 mm. longis, pilosiusculis. Alabastrum floris late ovatum. Flores apertientes 3-3½ cm. in diametro. Sepala 5 valde imbricata, caducissima, inæqualia, margine ciliolata, coriaceo-crassiuscula sericeo-pubescentia, extimis minoribus late orbicularibus vel late lunularibus 4 mm. latis, 3 mm. longis, intimis majoribus alabastrum floris involucratis, latissimis, apice obtuse acutiusculis, medio crassiusculis prope marginem tenuibus, 2 cm. latis. Petala 5-6, inæqualia, basi connata obovato-oblonga, 3-exteriora majora, obovato-oblonga, 1½ cm. longa, 12 mm. lata, apice truncato-emarginata, basi angustata, margine crispata, 2-interiora minora angustiora. Stamina numerosa, ad basin connata quam petalis breviora, 8 mm. longa. Ovarium dense breveque sericeo-hirsutum, 3-loculare (placentis incrassatis), cum stylo 7 mm. longum, ovoideum apice gradatim ad stylum abeuns, stylis 3 ad medium connatis, vel ad totam longitudinem connatis, stigmatibus ad apicem ramorum stylorum 2-lamellatis.

Hab. Shinkō.; Remogansha, leg. T. Kawakami et U. Mori 1906, Juni. (No. 1324).

This comes very near *T. reticulata*; but differs from it by the leaves and flowers.

Thea tenuiflora Hayata sp. nov. Rami graciles cinereo-rubescentes, superne foliati, ramulis novellis exsiccatis nigricantibus hirsutis basi perulatis, perulis rotundatis ciliolatis, 2-3-seriatim dispositis, cataphyllis spathulatis integris 1 cm. longis. Folia petiolata, coriacea, obovato-oblonga, vel oblonga, 4 cm. longa,

16 mm. lata, apice acuta ad summum extremitatem obtusa, basi cuneato-acuta, margine sursum distincte medio obscure serrulata, deorsum subintegra, utrinque exsiccato glabra, (sed novella ad costam pilosiuscula), utrinque pagine minute punctata, costis venis venulisque distincte elevatis, petiolis 5 mm. longis. Flores sessiles axillares solitarii. Sepala circ. 5, inæqualia, caduca, late rotundata, pauce pilosa, coriacea, 4 mm. lata, margine ciliolata. Petala circ. 5, inæqualia, obovato-oblonga, apice rotundata vel truncato-rotundata, basi cuneata, 18 mm. longa, 10 mm. lata. Stamina numerosa, 8 mm. longa, filamentis basi connatis. Ovarium minutum rotundatum, 1 mm. longum, stylis 3, ad totam longitudinem connatis, 3 mm. longis.

Hab. Wantan, leg. T. Kawakami, Jan. 1904.

Near *T. sasanqua;* but differs from it in having round petals. The petals of the present plant are usually oblong and round at the apex, while those of *T. sasanqua* are generally, if not always, notched at the apex.

Malvaceæ.

Sida Linn.

Sida mysorensis W. et A.; Hook. f. Fl. Brit. Ind. I. p. 322.

Hab. Akō; Chōshūshō, leg. G. Nakahara, Sept. 1905, (No. 511).

Distrib. India and the Philippines.

Observ. Leaves soft tomentose cordate, abruptly acuminate, margin serrulate, 9 cm. long, 7 cm. broad, petioles 5 cm. long; very like *S. humilis* Willd.

Thespesia Corr.

Thespesia populnea Corr. ; DC. Prodr. I. p. 456 ; Wight, Ic. t. 8 ; Bedd. Fl. Sylv. t. 63 ; Miq. Fl. Ind. Bat. I. pt.-2, p. 150 ; Masters, in Hook. f. Fl. Brit. Ind. I. p. 345 ; Merrill, in Philip Journ. Sci. IV.–Suppl. pp. 78 et 419.

Hab. Kōshūn : Manshū, leg. G. Nakahara, Dec. 1905, (No. 873).

Distrib. India, Tropical Asia, the Pacific Islands, and Africa,

Observ. Leaves cordate oblong, acute, or abruptly acute. entire, glabrous 13 cm. long, 10 cm. broad, long petiolate, petioles 10 cm. long ; flowers in my specimen subterminal, solitary, pedunculate. New to the Formosan flora.

Gossypium Linn.

Gossypium Nanking Myer. in Herb. Kew.

Hab. Nantō : Nankōkei, leg. T. Kawakami et U. Mori, 1907, Aug. (No. 1169).

Distrib.

I am following Sir George Watt's determination who has most cordially examined the plant at my request.

Sterculiaceæ.

Sterculia Linn.

Sterculia nobilis R. Brown. in Herb. Kew.

Nom. indig. Pin-pon.

Hab. Tainan, leg. T. Kawakami, Aug. 1906, (No. 1440).

Distrib. China and Sumatra.

Observ. A small tree; leaves large, oblong, 30 cm. long, 15 cm. broad membranaceous, nerves distinct, petioles 6 cm. long. Panicles 15 cm. long, loosely flowered. Flowers polygamous. Calyx campanulate 5-lobed, lobes lanceolate hairy. Fl. ♂: staminal column shorter than the calyx, declining, anthers sessile on the outside of the very short lobes, forming a globular terminal head. Fl. ♀.: ovary stalked, 4-lobed, with anthers at its base, style declining, stigma 4-lobed, tomentose. Capsules fleshy, leather-like, thick, ovate, beaked, sessile, 5-6 cm. long, bright scarlet, slightly velvety. The plant is not indigenous to Formosa; but comes from the opposite continent and is in the island found only in cultivation.

The present *Sterculia* is near *S. lanceolata* Cav.; but differs from it in the calyx with lanceolate lobes.

Pterospermum Schreb.

Pterospermum formosanum Matsum. in Matsum. et Hayata Enum. Pl. Formos. p. 62.

This is very like, or perhaps the same as, a specimen from Borneo, preserved at Kew, labelled *P. fuscum* Kuth.?, which specimen, however, is certainly different from the type of the named species.

Tiliaceæ.

Sloanea Linn.

Sloanea hongkongensis Hemsl. in Hook. Ic. Pl. XXVII. (1900) t. 2628.

Distrib. Hongkong.

I have seen in Formosa a specimen with a very spinous fruit, which specimen is apparently the same as the present species which I have seen in the Herbarium at Hongkong. The plant is, however, not yet represented in the Tōkyō Herbarium.

Zygophylleæ.

Tribulus Linn.

Tribulus cistoides Linn., Hook. f. Fl. Brit. Ind. I. p. 423; Forbes et Hemsl. Ind. Fl. Sin I. p. 97.

Hab. Pratas, leg. T. Kawakami, 1907, Juli.

Distrib. Throughout the warmer regions of both hemispheres.

Geraniaceæ.

Biophytum DC.

Biophytum sensitivum DC.; Matsum. et Hayata, l.c. p. 69.

Hab. Akō: Bongarisha, leg. G. Nakahara, Sept. 1905, (No. 544).

Observ. A very graceful herb, about 30 cm. high; leaves are gathered on the top of the stem, abruptly pinnate, 6-7 cm. long; pinnæ 20-30, obliquely oblong, 1 cm. long. Flowers many on long peduncles which are projected from the center of congested leaves.

Geranium Linn.

Geranium uniflorum Hayata Fl. Mont. Formos. p. 65.

Near *G. aconitifolium* and also *G. collinum* A. DC.; but differs

from the former by not branched peduncles, and from the latter in having much broader stipules.

Rutaceæ.

Fagara Linn.

Fagara integrifoliola Merrill, Flora of the Lamao Forest Reserve, in Philip. Journ. Sci. I. Suppl. p. 68.

Hab. Kōtōshō, leg. T. Kawakami et G. Nakahara, Mart. 1906, (No. 1064).

Distrib. The Philippines.

The plant is exactly referable to this species, so far as the description is concerned. The tree yields a soft woolly substance which densely covers the radical parts of the plant.

Clausena Burm.

Clausena lunulata Hayata sp. nov.

Clausena excavata Hayata in Matsum. et. Hayata Enum. Pl. Formos. p. 75, (non Burm.).

Rami fuscentes, cinereo-punctati, pubescentes. Folia pinnata, lanceolata in circumscriptione 25 cm. longa, 8 cm. lata, 31-41-foliolata, foliolis mediis maximis lunulatis 4 cm. longis, 12 mm. latis, apice obtusis vel retusis basi valde obliquis latere superiore truncatis latioribus, latere inferiore acuminatis angustissimis margine obscure crenatis vel integris, foliolis superioribus et inferioribus minoribus foliolo medio conformibus, glabris vel ad costam pubescentibus, petiolulis 2 mm. longis. Paniculæ terminales 20 cm. longæ 7 cm. latæ, floribus ad apicem ramulorum panicularum ternatim dispositis. Calyces 5-dentati, dentibus truncatis. Petala ignota.

Hab. Kōshūn : Kōkō, leg. T. Kawakami, Juli. 1906, (No. 1655); Kachiraisha, leg. C. Owatari, Mart. 1898.

In the Enumeratio Plantarum Formosanarum, I referred this plant to *C. excavata*, thinking that it might be a small form of that species. On examining a set of several specimens collected in different parts of the island, I have, however, found that the plant is always of the same constant form, and is quite different from the type of the named species in many points but especially in its leaves which are in the latter species very much larger, attaining the size of even 3-4 times those of the Formosan plant.

Simarubeæ.

Suriana Linn.

Suriana maritima Linn. ; DC. Prodr. II. p. 91 ; Hook. f. Fl. Brit. Ind. I. p. 522.

Hab. Prâtas, leg. T. Kawakami, 1907, Juni.

Distrib. On the sea-shores of the Tropics.

Burseraceæ.

Canarium Linn.

Canarium album Raensch. ; DC. Prodr. II. p. 80 ; Hance, in Journ. Bot. (1871), p. 39 ; Engl. in DC. Monogr. Phanerog. IV. p. 149 ; Forbes et Hemsl. Ind. Fl. Sin. I. p. 113.

Hab. Toroku : Rinkiho, leg. T. Kawakami, Aug. 1906.

Distrib. Cochinchina and South China.

Ilicineæ.

Ilex Linn.

Ilex ardisioides Lœs. in Nov. Act. Nat. Cur. LXXVIII.–I. (1901) p. 359.

Hab. South Cape, Dr. A. Henry!

I have seen the plant at Kew; it is not yet represented in the Herbarium at Tōkyō.

Ilex bioritsensis Hayata sp. nov. Rami validi, recti, corticibus cinerascentibus obtecti, ramulis rectis divaricatis, triquetris. Folia alterna breve petiolata, valido-coriacea, margine spinosa, rhomboideo-obovata, $3\frac{1}{2}$ cm. longa, 2 cm. lata, margine utrinque latere 1-2-spinoso-dentata, lobo (vel dente) centrali triangulari apice acuto valde aristato, aristis rectis, lobis (vel dentibus) lateralibus acutis recto-aristatis validis, basi rotundata, vel cordata, supra nitida subtus pallidiora, costis et venis supra leviter impressis, subtus leviter elevatis, petiolis 3 mm. longis nigricantibus. Drupæ axillares, solitariæ sessiles, obovoideæ 8 mm. longæ, apice obtusæ, basi sepalis 4 persistentibus triangularibus instructæ facie irregulariter minute punctatæ et leviter obscureque 2-3-cornutæ. Pyrenes 2, a dorso compressæ, dorso convexæ verticaliter circ. 8-sulcatæ, facie planæ, verticaliter circ. 6-sulcatæ, 5 mm. longæ, 4 mm. latæ.

Hab. Biōritsu: Taizan, leg. T. Kawakami et U. Mori, Oct. 1908, (No. 7185).

Very like *Ilex Pernyi* Franch. var. *Manipurensis* Lœs.; but differs from it in the shape of the drupe which has always two stones.

Ilex formosana MAXIM. ; MATSUM. et HAYATA l.c. p. 81.

HAB. Uraisha, leg. N. KONISHI, Aprili. 1908, (No. 78).

OBSERV. Branches blackish ; leaves elliptical acute at the base, acuminate or cuspidate at the apex, obtuse at the very tip, 7-8 cm. long, 2-3 cm. broad, margin obscurely crenulate, veins not very distinct on the upper surface, reticulated and dotted on the under surface, somewhat pale beneath, petioles about 1 cm. long. Flowers on a very short raceme which is almost contracted to a cluster.

Ilex goshiensis HAYATA sp. nov. Rami validi, cinerascentes, ramulis fusco-rubescentibus angulatis. Folia alterna petiolata, coriacea, obovato-oblonga, vel oblonga, 26 mm. longa, 16 mm. lata, apice retuso-acuta basi acuta, integerrima, supra opacissima, venis non visis, subtus pallidissima tenuiter venosa, petiolis 4 mm. longis. Drupæ ad axillas foliorum fasciculatæ, pedunculis 5 mm. longis, pedicellis 3 mm. longis, globosæ, 4 mm. in diametro, fusco-rubescentes, basi sepalis 4 persistentibus instructæ.

HAB. Shintiku : Goshizan, leg. T. KAWAKAMI, (No. 1258.)

Near *Ilex Championi* LOES. ; but differs from it in having shortly cuspidate leaves. The leaves of the other plant are very rounded or even emarginate at the apex. This is also near *Ilex memecylifolia* CHAMP., from which it differs in having leaves which are retused at the apex. There is in the Herbarium at Tōkyō a specimen from the Loo-choo islands which has been identified with *I. Hanceana* MAXIM., by Dr. T. ITŌ in the Tent. Fl. Lutch p. 367. The specimen is very like, or even the same as, the plant just described, and I have wondered if the Loo-chooan plant be really identical with *I. Hanceana*. I have seen the latter species at Kew and have noticed that it is differ-

ent from the Formosan plant. As is described by MAXIMOWICZ in his Coriar. Ilic. Monoch. p. 33, *I. Hanceana*, has "cymulæ ♂ breve pedunculatæ, 5-6-floræ, petiolum bis vel ter superantes, pedicelli calyce æquilongi, flores 4-meri circ. linam longi. Calyx puberulus, lobis ciliatis ovatis." But, in the Loo-chooan plant, we find "flores umbellati, umbellis cymose 5-6-fasciculatis, pedunculis umbellarum 5-6 mm. longis petiolum æquantibus, pedicellis florium circ. 3 mm. longis florem 2-plo superantibus."* In comparing the above descriptions, we see clearly that the Loo-chooan plant is not identical with MAXIMOWICZ's species. As to the identification of the Loo-choo plant with the present one, I am not as yet in a position to decide it. I can only add that they are very similar.

Ilex Kusanoi HAYATA sp. nov. Rami rugosi atro-purpurascentes, ramulis gracilibus, cinerascentibus, angulatis. Folia petiolata, alterna, chartaceo-membranacea, oblonga vel oblongo-ovata, vel-obovata, leviter obliqua, 5 cm. longa, 3 cm. lata, apice obtuse vel breve acuminata vel leviter cuspidata, vel obtuso-acuta, ad summum extremitatem breve aristata, basi acuta, margine obscure crenulato-serrata, apice serrarum aristata, prope basin subintegra. Flores ad axillas 2-3-4-fasciculati, longe pedunculati, pedunculis gracilibus 18 mm. longis, basi pedunculorum perulati, perulis minutis subulatis. Flores persimiliter hermaphroditi. Sepala 5, rotundata 1 mm. longa, persistentia, margine ciliolata. Corolla 5-lobata, rarius 6-lobata, 3 mm. longa, lobis rotundatis 2 mm. longis, tubo 1 mm. longo. Stamina 5 rarius 6, tubo corollæ affixa, 1 mm. longa, antheris triangularibus cordatis ½ mm. longis apice acutis, filamentis dilatatis. Ovarium globosum cum stylis 2 mm. longum, stylis

* The description above referred to has been drawn up by myself from a specimen from the Loo-choo Archipelago, which is referred to *I. Hanceana* MAXIM. by Dr. T. ITŌ.

brevibus stigmate subgloboso 5-lobato coronatis. Drupæ globosæ 3 mm. in diametro, apice breve acutæ stigmatibus 5-lobatis coronatæ.

HAB. Taitō, leg. S. KUSANO, Juli. 1908.

The present plant bears some resemblance to the Japanese *Ilex macropoda* MIQ., but the leaves of the Japanese plant are more or less hairy, while those of the Formosan are quite glabrous. Besides, the former has deciduous leaves, while the latter persistent ones. This is also near *I. macrocarpa* OLIV.; but differs from it in having much smaller fruit; from *I. taiwaniana* HAYATA, in having much thinner leaves and much larger flowers.

Ilex Mertensii MAXIM. var. **formosæ** LŒS. in Herb. Kew.

HAB. South Cape, Dr. A. HENRY.

I have seen the plant at Kew. It is not yet represented in the Herbarium at Tōkyō.

Ilex nokœnsis HAYATA sp. nov. Rami validi cinerascentes, lenticellis obtecti, pauce pilosi, pilis nigricantibus, ramulosi, ramulis divaricatis, foliosis, cinereo-rubescentibus brevissime hirsutis. Folia alterna breve petiolata, viridissima, oblongo-ovata, vel obovata, $2\frac{1}{2}$ cm. longa, $1\frac{1}{3}$ cm. lata, apice rotundato-obtusa, vel obtusa, interdum calloso-mucronata, basi acuta vel cuneato-acuta, margine sursum crenata, crenis apice callosiusculis, deorsum integra, supra costis venis et venulis impressis subtus leviter elevatis, petiolis 2 mm. longis.

HAB. Nōkōsan, ad 9000 ped. alt., leg. T. KAWAKAMI et U. MORI, 1908, Jan. (No. 4582).

This is very like *Ilex crenata* THUNB., but differs from it in having impressed veins on the surface of the leaves, which are quite obtusely crenate on the margin. In *I. crenata*, the leaves are shortly aristate at the apex of the teeth on the margin.

Moreover, the lower surface of the leaves of the same species is minutely dotted, while that of the present plant is quite smooth, but never dotted. It bears some resemblances to *I. luzonica* ROLFE and also to *I. Thomsoni*; but differs from the former in having obovate or oblongo-ovate leaves which are crenate towards the apex, and from the latter in having calloso-obtusely (but not mucronately) crenate leaves. Those of *I. luzonica* ROLFE are usually oblong, more acutely or mucronately crenate from the base to the apex, while these are usually obovate very obtusely crenate only towards the apex.

Ilex parvifolia HAYATA sp. nov. Ramuli graciles ramosi, ferrugineo-tomentosi. Folia approximata, breve petiolata, oblonga, 12 mm. longa, 6 mm. lata, coriacea, utrinque obtusa vel acuta, aristato-serrata, supra ad costas tomentosa, utrinque venis obscuris, petiolis supra tomentosis. Flores axillares, solitarii, pedicellati, sepalis 4, rotundatis, 1 mm. longis. Drupæ rubræ, globosæ, 6 mm. in diametro æquantes, 4-pyrenæ.

HAB. in monte Morrison, ad 8000 ped. alt., leg. T. KAWAKAMI et U. MORI (No. 2036); Arizan, in monte Morrison, leg. G. NAKAHARA, Oct. 1906.

Near *Ilex intricata* HOOK. f.; but differs from it by the thinner oblong leaves, which are more or less aristately toothed on the margin. *I. intricata* has nearly obovote leaves, without aristate teeth.

Ilex taisanensis HAYATA sp. nov. Rami cinerascentes, longitudinaliter rugulosi rectiusculi, ramulis rectis apice triquetris breve pubescentibus, vel subglabris rubescentibus. Folia alterna, longiuscule petiolata, chartacco-coriacea, oblonga, vel oblongo-ovata, 37 mm. longa, 15 mm. lata, apice acuta, basi rotundato-obtusa, margine a medio sursum obscure remoteque crenata, venis et

venulis utraque pagine inconspicuis vel tenuissimis, subtus pallidiora, petiolis 1 cm. longis, intus cum costis tenuissime brevissime pubescentibus. Drupæ ad axillas foliorum solitariæ, longe pedunculatæ, (pedunculis 2 cm. longis ad medium 2-bracteolatis, bracteolis lanceolatis 2 mm. longis), globosæ 5-6 mm. in diametro, albo-punctatæ, vel non punctatæ, basi calycibus quadrangularibus persistentibus instructæ. Pyrenes 3-5, a dorso compressiusculæ, dorso convexæ apice acutæ, læves 4 mm. longæ.

HAB. Biōritsu: Rokujō-taisan, leg. T. KAWAKAMI et U. MORI, 1908, Oct.

Near *Ilex embelioides* HOOK. f. which differs from the present plant in the leaves, more attenuate or cuspidate towards the apex. The leaves of the new plant are acute at the apex but never attenuate nor cuspidate.

Ilex taiwaniana HAYATA sp. nov. Ramuli cineracei glabri. Folia alterna ovata, obtuse acuta, basi acuta obliqua, mucronato-serrata, utrinque distincte venosa chartaceo-membranacea. Flores ad axillas 3-5-fasciculati, fasciculis pedunculatis, pedicellis 5 mm. ongis; sepalis 5, rotundatis 1 mm. longis; petalis 5, rotundatis. 2 mm. longis; staminibus 5 introrsis; rudimentum ovarii convexum Drupæ globosæ, 4 mm. longæ, longe pedunculatæ, (pedunculis 2 cm longis), 10-sulcatæ, 5-pyrenæ.

HAB. Kashiōtō, leg. G. NAKAHARA, Feb. 1906, (No. 1025).

Celastrineæ.

Euonymus LINN.

Euonymus Dielsianus LŒSENER, in ENGL. Jahrb. XXIX. (1900) p. 440, t. IV. L.

Hab. Suisha, Shūshūgai, leg. C. Owatari, Jan. 1898.

Distrib. Central China.

Observ. Sterilis, ramulis rectis viridiusculis longitudinaliter rugosis. Folia subopposita vel alterna lanceolata vel ovato-lanceolata vel oblonga apice acuminata ad summum obtusa basi attenuata margine sursum remote serrata, deorsum integra, supra exsiccato albescentia subtus pallidiora, 8-10 cm. longa, 3-4 cm. lata, petiolis 8 mm. longis, venis venulisque supra leviter elevatis, subtus inconspicuis.

I have compared the present plant with a Chinese specimen labelled *E. Dielsianus* in the Herbarium at Kew, and found that the Formosan plant is, so far as sterile specimens are concerned, identical with it. In this, Mr. Sprague concurs.

Euonymus Miyakei Hayata in Matsum. et Hayata Enum. Pl. Formos. p. 83, t VII.

Resembles very much *E. javanicus* Bl.; but the leaves of the present plant are always verticillate (ternate in almost all cases), while those of the Javan species are always opposite.

Euonymus Spraguei Hayata sp. nov.

Euonymus echinatus T. Itō, in Itō et Matsum. Tent. Fl. Lutch. p. 371 ; Hayata Fl. Mont. Formos. p. 69.

Rami teretes minute papilloso-punctati, striati, fulvo-cinerascentes, ramulis subtetragonis, sulcatis, fulvo-fuscentibus, gracilibus divaricatis. Folia opposita, ovato-oblonga, vel oblonga, 6½ cm. longa, 3 cm. lata, (interdum 4½ cm. longa, 23 mm. lata) chartaceo-coriacea, apice obtuso acuta vel obtuso-acuminata, basi acuta vel rotundata, margine serrulata serrulis obtusis, supra pallida, subtus pallidiora, costis et venis primariis supra leviter elevatis, subtus

costis elevatis, venis inconspicuis, petiolis 8 mm. longis intus sulcatis. Capsulæ cymose dispositæ, (cymis axillaribus, pedunculis gracilibus 3 cm. longis), lato globosæ 6 mm. in diametro, 2-4 lobatæ, 2-4-loculares, apice truncatæ, facie echinatæ, spinis interdum circ. 30, interdum 5–6, recurvis 1–2, mm. longis, stylis persistentibus. Semina quadrantiformia, rubescentia, 5 mm. longa, lævia, testis coriaceis.

HAB. Loo-choo et Formosa.

When I mentioned the present plant in my "Fl. Mont. Formos.", I was merely comparing it with a Loo-choo plant which had been determined by Dr. T. ITŌ, and referred to *E. echinatus* WALL. in the Tent. Fl. Lutch. p. 371. As the Formosan plant is exactly identical with Dr. ITŌ's plant, I used the same name for my plant. While working here at Kew, I have compared with Mr. SPRAGUE the present plant with the type of the named species, and have found that they are clearly not identical. The former is easily distinguishable from the latter by many points but especially by the very much fewer and much more slender prickles on the fruit. In WALLICH's species, the prickles are much more numerous and stronger. Our plant is very near *E. subsessilis* SPRAGUE (=*E. echinatus* LOUR.), but differs from it in having much fewer and more slender prickles. The new species is named in honour of Mr. T. A. SPRAGUE who has cordially assisted me in many ways during my work at Kew.

Celastrus LINN.

Celastrus Kusanoi HAYATA sp. nov. Scandens, ramis fuscentibus, longitudinaliter rugulosis, lenticellis pauce punctatis, ramulis divaricatis. Folia alterna petiolata, late globosa 8 cm. longa 9 cm.

lata, apice rotundata, brevissime cuspidata, (cuspidibus 8 mm. longis, obtusis) basi late truncata vel rotundata cordata, margine remote obscureque serrata, prope basin integra, chartacea, petiolis $2\frac{1}{2}$ cm. longis intus sulcatis. Capsulæ cymose dispositæ, (cymis axillaribus, pedunculis 2 cm. longis brevissime tomentosis) subglobosæ apice stylis persistentibus coronatæ, 3-valvatim loculicide dehiscentes, valvis osseis flavescentibus orbicularibus apice breve acutis, extus transverse rugosis, seminibus 2 a quoque loculis. Semina arillis rubescentibus obtecta, oblique cylindracea, leviter recurva, $4\frac{1}{2}$ mm. longa, 2 mm. lata, testis fusco-nigricantibus rugosis minute papillosis coriaceis duriusculis.

Hab. Formosa meridionalis, leg. S. Kusano, 1909.

The present plant is near *C. articulatus*; but differs from it in having more rounded leaves and transversely wrinkled carpels in a dried specimen. The leaves are nearly rounded, or slightly cordate at the base, shortly acute or nearly rounded at the apex, remotely serrulate on the margin, while those of *C. articulatus* are nearly obovate, acute or rounded, but never cordate, at the base. The carpels of the latter plant are not wrinkled, but rather smooth even when dried.

Rhamneæ.

Rhamnus Linn.

Rhamnus formosana Matsum. in Matsum. et Hayata Enum. Pl. Formos. p. 88, t. VIII.

The plant is very near *R. triquetra* Wall. and perhaps further study will prove them to be identical.

Rhamnus Nakaharai Hayata n. n.

Rhamnus arguta MAXIM. var. *Nakaharai* HAYATA Fl. Mont. Formos. p. 70.

The present plant is described in my paper above cited as representing a variety of *Rhamnus arguta* MAXIM. At Kew, I have examined the co-type of the latter plant and found that the difference between the type and the variety is so great that I have thought it better to raise the latter to specific rank. The new species differs from the other in having slender flowers with longer styles, and still more in the supra-axillary inflorescence.

Ampelideæ.

Vitis LINN.

Vitis dentata HAYATA sp. nov. Rami fulvo-tomentosi, (pilis patentibus brevibus), vel subglabrati, remote foliati. Folia 3-foliolata, petiolata), stipulata, in ambitu late triangularia membranacea, 10 cm. longa, 13 cm. lata, foliolo terminali oblongo, 9 cm. longo 4½ cm. lato, apice obtuso-acuminato basi rotundato-acuto, remote dentato, (dentibus ascendentibus brevissime aristatis), utrinque glabro, petiolulo 5 mm. longo, foliolis lateralibus oblique oblongo-ovatis apice obtuso-acutis, basi oblique rotundatis latere superiore acutis, inferiore rotundatis, 7½ cm. longis, 4 cm. latis, breve petiolulatis, petiolulis 5 mm. longis ; petiolis 3½ cm. longis, stipulis oblongo-rotundatis obtusis 6 mm. longis, medio ad axillas affixis, medio crassiusculis maculatis margine membranaceis basi caulem semi-amplectantibus. Cymæ oppositifoliæ, 4 cm. longæ totiusque latæ, ramulis rectangulare dispositis, pedunculis pedicellisque pubescentibus, pilis patentissimis, bracteis et bracteolis caducissimis. Fl. ♀ : calyces complanati, lobis brevissime triangularibus

pilosis, vel circ. obsoletis; corollæ patentes, 2 mm. longæ, lobis 5, valvatis, ovato-triangularibus apice acutis subito acute-reflexis a dorso connatis brevissime cornutis. Ovarium conicum cum stylis 2 mm. longum, basi contractum supra basin 4-5-cornutum, stylis brevissimis apice stigmatibus 4-5-lobatis coronatis.

Vitis umbellata Hayata in Matsum. et Hayata Enum. Pl. Formos. p. 93, (non Hemsl.).

Hab. Shakkō, leg. S. Nagasawa, Aprili. 1903, (No. 43).

Near *Vitis corniculata* Benth.; but differs from it in having acutely dentate leaves.

Vitis triphylla Hayata sp. nov. Ramuli fuscentes, hirsuti, remote foliati. Folia trifoliolata, in ambitu triangularia, hirsuta, foliolo terminali oblongo-lanceolato, foliolis lateralibus longiori 7 cm. longo, 27 mm. lato, apice acuminato basi obtuso-rotundato, margine remote obscureque serrato, (costis et venis utrinque leviter elevatis tenuissimis), subtus pallidiori ad costas fusco tomentoso ad paginam hirsuto, petiolulo 15 mm. longo tomentoso; foliolis lateralibus ovato-oblongis obliquis apice acutis basi oblique rotundatis, latere superiore acutis, latere inferiore rotundatis vel cordatis, 4½ cm. longis, 2 cm. latis, cæterum foliolo terminali conformibus, petiolulis 3 mm. longis; petiolis 3 cm. longis, stipulis ovato-lanceolatis 5 mm. longis. Cymæ oppositifoliæ. Baccæ globosæ, 8 mm. in diametro, 1-spermæ.

Vitis angustifolia Hayata in Matsum. et Hayata Enum. Pl Formos. p. 90, (non Wall.).

Hab. Shifun, leg. C. Owatari, 1897, Dec.

Very near *Vitis angustifolia* Wall.; but differs from it in having more hairy, and very obscurely, and remotely serrulate, or nearly entire, leaves.

Sapindaceæ.

Allophylus Linn.

Allophylus Cobbe Blume "Rumph. III. p. 131;" Hook. f. Fl. Brit. Ind. I. p. 673.

Ornitrophe Cobbe Willd. Sp. Pl. II. p. 322.

Schmiedelia Cobbe DC. Prodr. I. p. 610; Wight Ic. t. 964.

Ornitrophe serrata Benth. Fl. Austral. I. p. 455.

Schmiedelia villosa Wight Ic. t. 401.

Schmiedelia Rheedii Wight Ic. t. 964.

Hab. Kōshūn, leg. T. Kawakami, Oct. 1904; Pratas island, leg. T. Kawakami, Juni. 1908, (No. 7).

Distrib. North Australia, Indian Archipelago. New to the Formosan flora.

Pometia J. R. et Forst.

Pometia pinnata J. R. et Forst "Char. Gen. p. 110. t. 55." Hook. f. Fl. Brit. Ind. I. p. 691, (ad nota *P. tomentosa*).

Hab. Taitō: Beirin, leg. T. Kawakami et Z. Kobayashi, Mai. 1906, (No. 1522).

Distrib. Pacific islands.

Acer Linn.

Acer albo-purpurascens Hayata sp. nov. Ramuli rubro-purpurascentes, teretes, glabri. Folia elongato-oblonga vel oblongo-lanceolata, 10 cm. longa, 3 cm. lata, apice acuminata, (acuminibus linearibus apice obtusis 1½ cm. longis) basi acuta, margine undulato-integra, vel integra, supra viridia, subtus glauca, albo-purpurascentia, obscure 3-nervia, nervo centrali valido, rubescente, nervis

lateralibus tenuissimis vel rarius obsoletis, venis lateralibus primariis nervi centralis utraque latere 7, subrectis angulo 50° a costa divaricatis, supra nervis venis venulisque leviter elevatis reticulatis, subtus prominentibus reticulatis, petiolis 1½ cm. longis intus sulcatis.

Hab. Giokusan, leg. S. Honda.

Near *Acer lævigatum* Wall. and still nearer *A. Fargesi* and also very like some form of *A. oblongum* Wall.; but quite easily distinguishable from them by the leaves which are acuminate at the apex and acute at the base.

Acer caudatifolium Hayata sp. nov.

Acer caudatum Matsum. in Tōkyō Bot. Mag. XII. p. 63; Matsum. et Hayata Enum. Pl. Formos. p. 96, (non Wall.).

Ramuli fusco-cinerascentes, remote foliati. Folia ovato-lanceolata, 8 cm. longa, 3½ cm. lata apice acuminata basi cordata, utraque latere obscure 3-dentato-lobata, crenato-serrata, obscure 5-nervia, nervo centrali nervos laterales 3-plo, nervos basilares 7-plo superante, venis primariis nervi centralis utraque latere 5, angulo 40° a costa divaricatis, subtus nervis venis venulisque elevatis rubescentibus subtus pagine pallidiora, petiolis 1½ cm. longis, intus sulcatis.

Hab. Giokusan, leg. S. Honda.

The present *Acer* is very different from *A. caudatum* Wall., but very near *A. Davidi* Franch. The new species is distinguishable from the latter in having much larger serration of the leaves.

Acer duplicato-serratum Hayata sp. nov.

Acer sp. aff. *A. micrantho* S. et Z.; Hayata Fl. Mont. Formos. p. 71.

Ramuli glabri. Folia ambitu orbicularia 7 cm. in diametro, palmatim 7-loba, lobis lanceolatis acuminatis, duplicato-serratis, lobo terminali 5 cm. longo 1½ cm. lato, lobis infimis brevioribus 2½ cm. longis, petiolis 2 cm. longis.

HAB. Taitō: Batai-ankei, in monte Lagulan, ad 5000 ped. alt., leg. N. KONISHI, Juni. 1902.

Acer morrisonense HAYATA sp. nov.

Acer sp. aff. *A. cratægifolio*, HAYATA Fl. Mont. Formos. p. 71.

Ramuli glabri, atro-purpurei. Folia ovato-cordata 5-nervia, 8 cm. longa, 5 cm. lata leviter 3-loba, lobis inconspicuis obtusissimis, margine præter apicem duplicato-serrata, apice acuminata vel cuspidata, cuspidibus serrulatis, petiolis circ. 3 cm. longis.

HAB. in Monte Morrison.

Near *Acer Davidi* FRANCH.; but differs from it in having leaves with three lobes, two of which are very obscure; also very like *A. laxiflorum*, but quite distinct from it. There is a specimen exactly like this at Kew, labelled "*Acer* aff *Hookeri*, China, No. 218." It is very like *A. Hookeri* but quite separable from it.

Acer rubescens HAYATA sp. nov.*

Acer sp. aff. *A. rufinervi* HAYATA Fl. Mont. Formos. p. 72.

Ramuli palliduli exsiccato nigricantes. Folia ambitu cordata octagona leviter 5-loba, lobis brevissimis cuspidatis, cuspidibus terminalibus angustis linearibus, lateralibus latioribus serrulatis, infimis brevissimis, basi cordata, margine præter cuspidem duplicato-serrata, 9-10 cm. longa, 7 cm. lata, coriacea, longe petiolata, petiolis 6-7 cm. longis.

HAB. Taitō, Batai-ankei, ad 7600 ped. alt., leg. N. KONISHI, Juni. 1902, (No. A. 11).

There is a specimen very much like this at Kew. The specimen is labelled "*Acer capillipes* MAXIM. Japonia, Nippon,

* After completing this manuscript, I have found that the plant is very like, or perhaps the same as, *Acer insularis* which has quite recently been described by Mr. T. MAKINO. His specimen is, however, not accessible for us in the Herbarium at Tōkyō.

Prov. Sinano, 1864 leg. Tschonoski." The present plant differs from it in the leaves with larger serration and longer side lobes placed on a little upper portion. Our plant is also very near *A. rufinerve* from which it is distinguishable by the leaves with more round or slightly cordate base; from *A. erosum* Pax, by the quite glabrous leaves.

Acer oblongum var. **Itoanum** Hayata n. v.

Acer oblongum var. *microcarpum* T. Itō in Itō et Matsum. Tent. Fl. Lutch. p. 387. (non Hiern.)

Rami cinereo-rubescentes, glabri, ramulis fusco-rubescentibus, teretibus lenticellis minutis parce dispersis. Folia opposita, longe petiolata, ovata, 7 cm. longa, 33 mm. lata, apice acuminata, (acuminibus circ. 1 cm. longis apice obtusis), margine integra vel leviter undulato-integra, utrinque glabra, concolora, vel subtus glauca, costis venis venulisque utraque leviter elevatis reticulatis, basi 3-nervia, nervis basilaribus a nervo centrali angulo 40°-50° divaricatis, venis primariis nervi centralis utraque latere 2, coriacea. Fructus in cymas terminales dispositi. Carpella glabra, cum alis circ. 3 cm. longa, loculis leviter nervosis, a medio leviter elevatis, gradatim ad alas abeuntibus, alis cultriformibus semi-oblongis, 2 cm. longis, 1 cm. latis, latere exteriore rectis, latere interiore rotundatis apice obtuso-rotundatis, sinibus inter alas rotundato-angustatis, alis latere exteriore angulo 40° divaricatis.

Hab. Loo-choo : Kushimajiri, leg. S. Tanaka, Mai. 1891, et Prof. J. Matsumura ; Nagodake, leg. G. Nakahara, Aprili. 1907.

The present plant was erroneously regarded by myself and other botanists as identical with *A. oblongum* Wall. At Kew, I have compared the plant with the type of the named species and found that they do not entirely agree. I have examined several forms of *Acer oblongum* from the Himalayas, China and Formosa,

but I have not found that any of the forms of the same species comes in accord with the Loo-chooan plant in respect of the shape of leaves. Accordingly I have thought it better to regard the latter as representing a new variety of the species. The present variety differs from the type in having ovate leaves, quite rounded at the base, acuminate at the apex, with three distinct nerves, and two distinct lateral veins on both sides of the central nerve. The leaves of the type are oblong, or obovately oblong, or rarely ovate-oblong, much more obtuse at the apex, and nearly acute at the base, pinninerved or obscurely three-nerved, with more than six lateral veins on both sides of the central nerve. The new variety is named in honour of Dr. T. Itō who has done so much for the study of the flora of these interesting Archipelago.

Acer Oliverianum Pax var. **Nakaharai** Hayata n. v.

Ramuli palliduli glabri. Folia ambitu late orbicularia 7 cm. longa, 10 cm. lata palmatim 5-loba, basi cordata, lobis triangularibus cuspidatis 3-3½ cm. longis 2 cm. latis vel latioribus, margine serrulatis, serraturis acutis, venis subtus pilosiusculis demum glabris. Flores cymosi; cymæ ad ramulos 2-foliatos terminales, cum pedunculis 3-5 cm. longæ, glabræ, 3-plo ramosæ, pedicellis terminalibus 6 mm. longis. Flores ♀: sepala 5, rotundato-oblonga, 2 mm. longa, extus intusque versus apicem hirsuta, margine tomentoso-ciliolata. Petala 5, rotundata, 1¼ mm. longa, margine obscure denticulata, vel subintegra basi acuta. Stamina 7, rarius 5, 2 mm. longa, filamentis 1 mm. longis, antheris oblongis 1 mm. longis apice obtusis basi emarginatis. Ovarium late dilatatum ⅔ mm. longum, 2⅓ mm. latum hirsutum, stylis 2 ad totam longitudinem connatis 2 mm. longis, disco extrastaminali, incrassato, 7-5-lobato,

lobis rotundatis. Carpella elliptico-oblonga loculis 4 mm. longis, alis dimidiato-obovatis, divaricatis cum carpello 2-½ cm. longis, angulo obtuso 120° divaricatis.

Hab. Chōsōkei, leg. G. Nakahara, Juli. 1905, (No. 161).

The present variety differs from the type by the carpels which divaricate in an obtuse angle. Those of the type divaricate in 180°.

form. **longistaminum** Flores monœcii: cymæ ad ramulos 2-foliatos terminales. Fl. ♂. 4 mm. in diametro; sepala 5, rarius 6, oblonga, extus intusque pilosiuscula, 1½ mm. longa. Petala 5, obovato-oblonga, 2 mm. longa, apice rotundata, margine obscure denticulata vel subintegra, basi cuneata 2 mm. longa. Stamina circ. 7.4 mm. longa, filamentis filiformibus, apice tenuissimis medio incrassatis 3 mm. longis, antheris cordato-ovatis 1 mm. longis, apice obtusis basi cordatis. Ovarii rudimentum minutum cum stylis 1 mm. longum pilosissimum, disco extra-staminali 7-8-partito, partibus clavatis incrassatis. Fl. ♀: calyx 5-6-partitus, 2 mm. longus, segmentis oblongis apice rotundatis. Petala ut ♂. staminodium 0. Discus extra-staminalis, 7-lobatus. Ovarium late dilatatum pilosiusculum, stylis brevissimis.

Hab. Akō, (No. 3136); Kelung, (No. 4239).

Acer Oliverianum Pax var. **microcarpum** Hayata. n. n.

Rami et folia ut in typica. Flores ignoti. Carpella glabra, cum alis 2½ cm. longa, loculis leviter nervosis, alis oblongis 2-2½ cm. longis, apice rotundatis basi angustatis, margine latere exteriore rotundatis curvis, angulo 110°-120° divaricatis.

Hab. Shintiku: Daitōge, leg. T. Kawakami et U. Mori, 1906, Juli. (No. 1426), et leg. S. Kusano, 1909.

Differs from the type in having extremely small carpels

which are, small as they are, quite in mature state having albumen and embryo. This differs also from the other variety *Nakaharai* in the shape of wings. In the present variety, the wings are usually oblong, while in the other, they are always semi-oblong or cultriformed.

Acer serrulatum HAYATA sp. nov. Rami teretes fusco-rubescentes, glabri, foliati, infra axillas foliorum leviter dilatati. Folia palmatim 5-lobata, rotundato-cordata in ambitu, 7½ cm. longa, 9 cm. lata, duplicato-serrulata, lobis æqualibus, 5-nervia, nervis angulo 60° a se divaricatis, nervo centrali nervis lateralibus subæquilongo vel paulo longiori nervos basilares 2½-plo superante, lobo terminali lanceolato 7½ cm. longo, 2 cm. lato, apice acuminato, lobis lateralibus et basilaribus conformi, petiolis 2½ cm. longis basi leviter dilatatis.

HAB. Shintiku : Taihei, leg. T. KAWAKAMI et Y. SHIMADA, Sept. 1907, (No. 5648).

Near *Acer palmatum* THUNB. ; but differs from it in the serration of the leaves.

Acer Tutcheri DUTHIE var. **Shimadai** HAYATA n. v. Rami validi, teretes, fusco-nigricantes, lenticellis minutis parce dispersis, ramulis divaricatis, a latere compressis complanatis, infra axillas foliorum leviter dilatatis. Folia opposita, petiolata, late rhomboidea, 5 cm. longa, 7 cm. lata, 3-lobata, serrulata, prope basin subintegra, lobis subsimilibus, (rarius lobis basilaribus minoribus), lobo terminali late triangulari utraque latere margine recto, 2½ cm. longo, 3 cm. lato, lobis lateralibus divaricatis latere superiore rectis horizontalibus, latere inferiore basin rotundatis, distincte 3-nervia, nervo centrali 5 cm. longo, nervis lateralibus 4½ cm. longis, a centrali angulo divaricatis, petiolis 4 cm. longis, ad basin in-

crassatis. Cymæ fructiferæ ad apicm ramulorum 2- vel 4-foliatorum terminales cum pedunculis 7 cm. longæ, 6 cm. latæ, pedunculis 2-3 cm. longis. Carpella glabra, loculis ovoideis 4½ mm. longis leviter nervosis, alis cultriformibus 1½ cm. longis 6 mm. latis, latere interiore recurvis apice rotundatis, latere exteriore rectis angulo 40° a se divergentibus.

Hab. Shintiku, leg. T. Kawakami et Y. Shimada, 1907, Sept. (No. 5657).

Very near the type; but differs from it in having much smaller carpels with much less divaricate wings.

Sabiaceæ.

Meliosma Blume.

Meliosma squamulata Hance; Matsum. et Hayata Enum. Pl. Formos. p. 99.

Hab. Banchoryō, leg. T. Kawakami et U. Mori, 1907, Nov. (No. 5517); Uraisha, leg. N. Konishi, Mart. 1908, (No. 58).

Distrib. Java, Philippines.

Observ. Arbor, ramis ultimis validiusculis cinerascentibus, crebre lenticellatis cæterum glabris. Folia simplicia longe petiolata, coriacea, oblongo-lanceolata, 10-12 cm. longa, 3½-4½ cm. lata, apice acuminata vel caudata, basi attenuata, supra glaberrima, nitida, subtus pallidiora, vel glauca, sub microscopio minute lepidota et pubescentia, venis primariis arcuatis ante marginem anastomosantibus, ultimis minute reticulatis, petiolis circ. 7-8 cm. longis. Flores albi racemoso-paniculati. Paniculæ erectæ 15 cm. longæ 5 cm. latæ, ramis gracillimis, 5-6 cm. longis, lateralibus divaricatis, omnibus pilis ferrugineis vestitis, bracteis bracteolisque minutis

squamiformibus. Pedicelli 1-3 mm. longi. Sepala late rotundata circ. 2 mm. lata, margine ciliolata. Petala 5, 3 majora late rotundata $3\frac{1}{2}$ mm. longa, totiusque lata, 2 minora 1 mm. longa angustata apice 2-dentata, staminibus opposita. Stamina 2, filamentis dilatatis 2 mm. longis. Staminodia 3, petalis majoribus opposita, filamentis valde dilatatis. Discus parvus irregulariter dentatus. Ovarium glabrum, globosum, cum stylo sursum attenuatum 2 mm. longum, 2-loculare.

Leguminosæ.

Crotalaria Dill.

Crotalaria acicularis Ham. ; Baker in Hook. f. Fl. Brit. Ind. II. p. 68.

Hab. Banchoryō, leg. T. Kawakami et U. Mori, 1907, Nov. (No. 5517).

Distrib. Java, Philippines.

Crotalaria elliptica Roxb. ; Benth. Fl. Hongk. p. 75 ; Forbes et Hemsl. Ind. Fl. Sin. I. p. 151.

Crotalaria Vachelli Hook. et Arn. Bot. Beech. Voy. p. 180 ; Walp. Rep. I. p. 588.

Crotalaria splendens Walp. Rep. I. p. 590.

Hab. Akō, leg. T. Kawakami, 1906.

Distrib. Kwangtung, Hongkong.

Observ. Scandens, pubescens, ramosa, flexuosa. Folia trifoliolata, pubescentia, petiolata, petiolis 3 cm. longis, foliolo longioribus, foliolis subsessilibus, terminali lateralibus paulo longiori, oblongo vel obovato, retuso vel minute mucronato 3 cm. longo 2 cm. lato,

lateralibus terminali conformibus. Spicæ ad axillas foliorum ramulorum superiorum, 7-8 cm. longæ pedunculatæ. Flores 6 mm. longi, pedicellati, pedicellis 3 mm. longis. Calyces basi minute 2-bracteati, (bracteis subulatis), campanulati 3 mm. longi, 5-lobati, lobis tubo æquilongis triangularibus acutis, 1½ mm. longis 1 mm. latis, pubescentibus. Vexillum orbiculatum unguiculatum, (lamina 5 mm. longa extus medio leviter carinata, ungue 1½ mm. longo) intus villosum, supra unguem valde reflexum, 2-callosum; alæ obovatæ 6 mm. longæ; carina incurva 7 mm. longa, rostrata. Ovarium stipitatum, (stipite 1½ mm. longo), 2-ovulatum, villosum, stylo medio abrupte inflexo superne intus plus minus longitudinaliter barbato. Stamina omnia in vaginam supra fissam connata. Legumina pedicellata, cernua, adpresse villosa, obovoidea vel globosa 6 mm. longa 4 mm. lata, apice oblique inflata, stylo rostrata, 2-sperma.

Near *C. Trifoliastrum* Willd.; but differs in having much larger obovate leaflets and larger flowers.

Crotalaria Kawakamii Hayata sp. nov. Ferrugineo-hirsuta vel tomentosa, erecta, ramosa, 40-50 cm. longa. Folia alterna, oblongo-linearia, ferrugineo-tomentosa, sessilia, 2 cm. longa, 4 mm. lata subtus glandulosa, ad marginem costasque longe hispida. Flores solitarii axillares vel terminales. Calyces campanulati, 1 cm. longi, basi 2-bracteati, (bracteis subulatis 6 mm. longis), 5-fidi, lobis lanceolatis longe flavido-ferrugineo-strigosis. Legumen inflatum oblique oblongum 13 mm. longum, 5 mm. latum, glabrum.

Hab. Taichū, leg. T. Kawakami et U. Mori, Aug. 1906, (No. 1208).

Very near *C. ferruginea*; but differs in having smaller, narrower and more strigose leaves and much smaller pod.

Crotalaria similis HEMSL. in Ann. Bot. IX. p. 152; MATSUM. et HAYATA Enum. Pl. Formos. p. 103.

HAB. Kōshūn: Garanbi, leg. T. KAWAKAMI et G. NAKAHARA, Dec. 1906, (No. 850).

OBSERV. A very small herb, procumbent at the base, the erect portion nearly 8 cm. long; leaves secund turning to one side, villous above, silky below, ovate or even round, 8 mm. long, 4-5 mm. broad, very approximate, leafy along the whole length of the stem. Flowers terminal solitary or a very few, sepals lanceolate, pod black nearly globular, 1 cm. long.

Indigofera LINN.

Indigofera glandulifera HAYATA sp. nov. Suffrutices graciles glabri, vel pubescentes, ramosi. Folia trifoliolata, petiolata, petiolis 5 mm. longis, foliolis subsessilibus vel breve petiolulatis, oblongo-obovatis vel oblanceolatis apice rotundatis vel breve mucronatis basi angustatis, 1 cm. longis 4 mm. latis utraque pagine adpresse pubescentibus, subtus glanduloso-punctatis. Flores parvi 3 mm. longi, ad axillas fasciculati. Calyces pubescentes 2½ mm. longi, 5-fidi, lobis linearibus 2 mm. longis. Petala extus pubescentia. Vexillum obovatum 3 mm. longum, 1½ mm. latum basi angustum; alæ angustatæ, 3 mm. longæ; carina leviter incurva apice rotundata, 3 mm. longa, latere superiore ciliolata. Ovarium cylindraceum 1½ mm. longum. Legumen lineare leviter complanatum, tetragonum in sectione, tetra-pterum, 12 mm. longum, 1½ mm. latum.

HAB. Akō: leg. G. NAKAHARA, Sept. 1905, (No. 538); Taitō: Hinan, leg. T. KAWAKAMI et Z. KOBAYASHI.

Near *I. trifoliata*; but differs in having 4-winged pod and gland-dotted leaves which are more conspicuously dotted on the lower surface.

Indigofera Kotœnsis Hayata sp. nov. Suffrutex, ramis fulvo-cinerascentibus lenticellis dispersis, ramulis rectis subtetragonis vel subteretibus, pauce pubescentibus, vel sub-glabratis, remote foliatis. Folia imparipinnata, ambitu oblongo-linearia, 18 cm. longa, 8 cm. lata, tenuiter pubecentia, foliolis lateralibus æquilongis utraque latere 5-6, oppositis, foliolo terminali conformibus, oblongis 5½ cm. longis, 2 cm. latis, apice obtusis ad summum breve aristatis, basi obtusis, integerrimis tenuiter chartaceis, vel membranaceis, venis supra tenuiter elevatis, subtus inconspicuis, supra depressopubescentibus, petiolulis 3 mm. longis, petiolis 2 cm. longis, cum rhachis supra canaliculatis, glandulosis, foliolo terminali quam lateralibus majore. Racemi terminales vel axillares 8 cm. longi, dense florati, (pedunculis 1 cm. longis), bracteis ad pulvinos pedicellorum minute ciliato-dentes reductis, ad pedicellis 3 mm. longis. Flores 9 mm. longi, pubescentes. Calyx late campanulatus, valde obliquus, latere superiore 1½ mm. longus, latere inferiore 3 mm. longus, 6-dentatus. Vexillum rotundatum apice rotundatum 11 mm. longum 7½ mm. latum basi late truncato-obtusum. Alæ angustatæ 9 mm. longæ, 2 mm. latæ basi dorso carinatæ. Carina late cultriformis, 9 mm. longa, 3½ mm. lata, apice obtusa, basi late truncata. Ovarium glabrum.

Hab. Kōtōshō, leg. T. Kawakami et G. Nakahara, 1906, Mart. (No. 1063).

Near *Indigofera atropurpurea* Roxb.; but differs from it by slightly curved pod and very short bracts reduced to ciliate teeth. The bracts of *I. atropurpurea* are very long, and exceed flower-buds in length.

Indigofera trifoliata Linn.; Hook. f. Fl. Brit. Ind. II p. 96; Hance in Journ. Bot. (1879), p. 105; Wight Ic. Pl. Ind. Or. t. 314; Forbes et Hemsl. Ind. Fl. Sin. I. p. 137.

DISTRIB. Through Tropical Asia to North Australia.

HAB. Kōshūn : Garanbi, leg. T. KAWAKAMI et G. NAKAHARA, (No. 864) ; Kōtōshō, leg. G. NAKAHARA, Mart. 1906, (No. 1059).

Indigofera venulosa CHAMP. ; WALP. Ann. IV. p. 487 ; BENTH. Fl. Hongk. p. 77 ; FORBES et HEMSL. Ind. Fl. Sin. I p. 158.

HAB. Byōritsu : Daitōsei, leg. T. KAWAKAMI et U. MORI, Juli. 1906, (No. 1116) ; Horisha : Tochikōan, leg. G. NAKAHARA, Aug. 1905, (No. 327).

DISTRIB. China : Kiangsu, Kiangsi, Chekiang, Hongkong; Corean Archipelago.

OBSERV. A small shrub, leaves imparipinnate, 3-4-juged ; pinnæ remotely opposite, stipellate, ovate, apiculate, 2 cm. long, 1 cm. broad, dark above, whitish below ; flowers red, 1 cm. long, racemose ; pod linear 5 cm. long, 4 mm. broad, black, nearly straight or slightly incurved.

Smithia AIT.

Smithia Nagasawai HAYATA sp. nov. Suffrutescens, ascendens, ramis rectis gracilibus remote ramulosis, glabris tenuiter striatis, fusco-rubescentibus, teretibus, ramulis gracillimis remote foliatis. Folia alterna caducissima pari-pinnata, late ovata in ambitu, $1\frac{1}{2}$ cm. longa, apice setis 3 mm. longis terminata, pinnis suboppositis, 5-6-jugis lineari-oblongis 1 cm. longis, $2\frac{1}{4}$ mm. latis, margine remote ciliato-setulosis, apice rotundato-setulosis, (setulis $\frac{2}{3}$ mm. longis), basi valde obliquis, latere superiore acutis, latere inferiore rotundato-cordatis, supra glabris subtus ad costas remote setulosis, (setulis $1\frac{1}{2}$ mm. longis), petiolulis brevissimis $\frac{1}{4}$ mm. longis, pinins superioribus quam inferioribus minoribus, pinnis a se 2 mm. remotis, exstipellatis ; petiolis 2-3 mm. longis, cum rhachibus

supra anguste alatis, infra longe setosis, setis 2 mm. longis, stipulis membranaceis acuto-ovatis 5 mm. longis, multinerviis margine ciliato-serrulatis, basi latere interiore longe auriculatis, (auriculis angustatis, 2 mm. longis), apice truncatis. Racemi breves 3-5 mm. longi, recurvi, prope apicem ramulorum axillares, pedunculati, pedunculis 1-2 cm. longis, pedicellis 1½ mm. longis basi 1-bracteatis, (bracteis hyalinis ovato-angustatis 3 mm. longis margine ciliato-setosis obliquis), apice 2-bracteolatis, bracteolis (ovato-acutis, 5 mm. longis, utrinque acutis, margine setosis (setis 1½ mm. longis), extus setulosis, intus glabris). Calyx 2-partitus, segmento superiore late ovato, plicato, 6 mm. longo, 7-8 mm. lato, apice rotundato-emarginato, medio carinato, margine a medio sursum ciliato-setuloso, deorsum integro, multinervio, extus ad carinam setuloso; segmento inferiore obovato, 6 mm. longo, 3½ mm. lato, ciliato-setoso, prope basin integro. Petala non visa. Legumina intra calycem inclusa, 2-plo spiraliter recurva, ad suturam superiorem inter articulos constricta, articulis 7-8 demum secedentibus, oblique late globosis, 1½ mm. latis, minute irregulariter maculato-punctatis, ad suturam inferiorem carinatis, suturis superioribus convexo-rotundatis, suturis inferioribus rectis leviter incurvis. Semina reniformia, latere compressa 1½ mm. lata, 1¼ mm. longa.

Hab. Kodenshō, leg. S. Nagasawa, Oct. 1905, (No. 743).

The present plant bears some resemblance to *Smithia ciliata* Royle, from which it is distinguishable by the truncated or rather round apex of the bracts. The bracts of *S. ciliata* are rather acute at the apex.

Desmodium Desv.

Desmodium formosanum Hayata sp. nov. Rami subrecti,

albicantes, fusco-tomentosi, remote foliati. Folia trifoliolata, ambitu late ovata, cum petiolis 10 cm. longa, 7 cm. lata, foliolo terminali oblongo vel oblongo-obovato, 6½ cm. longo, 3½ cm. lato, apice rotundato, ad summum aristato, (aristis 4 mm. longis) basi obtuso, leviter cuneato, integro, supra adpresso-piloso, subtus brevissime villoso, ad costam et venas fusco-tomentoso, costis et venis primariis supra leviter subtus prominente elevatis, venis primariis utrinque latere 12, leviter curvatis ad marginem attingentibus, venulis inter venas oblique transversis, pitiolulo brevissimo 2 mm. longo, rhachis 1 cm. longo, foliolis lateralibus terminali conformibus minoribus, oblongo-ellipticis basi leviter obliquis latere inferiore rotundato-obtusis, latere superiore acutis, 4 cm. longis, 2 cm. latis, petiolulis 2 mm. longis, stipellis lanceolato-subulatis, 4 mm. longis, petiolis 1½ cm. longis, villoso-tomentosis, stipulis subulatis, leviter recurvis basi subito dilatatis, 1 cm. longis, 3 mm. latis, extus villoso-tomentosis intus glabris. Flores paniculato-racemosi, paniculis 2 cm. longis, 15 cm. latis, fusco-tomentosis, pedicellis 3 mm. longis tomentosis, bracteis caducissimis. Calyx 5-lobatus, patens, 5½ mm. longus, lobis æqualibus 4½ mm. longis, 2 mm. latis, caudato-ovatis, apice cuspidato-acuminatis extus patente-tomentosis, intus glabris. Petala 5, circ. æquilonga; vexillum late rotundatum 7½ mm. longum, 6½ mm. latum, apice emarginatum, basi late rotundatum, subito acutum; alæ oblongæ, basi obtusæ latere superiore auriculatæ: carina navicularis apice rotundata, basi angustata latere superiore leviter auriculata; tubus staminalis ruber; stylus reflexus.

Hab. Banchoryō: Juchori, leg. G. Nakahara, Oct. 1905, (No. 586).

Near *Desmodium concinnum* DC.; differs from it in having smaller bracts which are rounded at the base, and also in smaller stipules.

Desmodium podocarpum DC., Hook. f. Fl. Brit. Ind. II. p. 169; Forbes et Hemsl. Ind. Fl. Sin. I. p. 174.

Hab. Shintiku: Taihei, leg. T. Kawakami, Sept. 1907, (No. 6046).

Distrib. North India, Mandshuria, Japan and China.

Desmodium reniforme DC.; Hook. f. Fl. Brit. Ind. II. p. 173.

Hab. Banchoryō, leg. G. Nakahara, Oct. 1905, (No. 602).

Distrib. India and Java.

Observ. Very slender, scandent herb; leaves broadly reniformed, 1½ cm. long, 2½ cm. broad, glaucous beneath, membranaceous, stipules subulate, scaly, 5 mm. long; flowers on very long and slender racemes, very loosely arranged, very small, nearly 3 mm. long, shortly pedicelled.

Alysicarpus Neck.

Alysicarpus bupleurifolius DC.; Benth. Fl. Hongk. p. 81; Hook. f. Fl. Brit. Ind. II. p. 158; Forbes et Hemsl. Ind. Fl. Sin. I. p. 178.

Hab. Akō: Kotanshō, leg. G. Nakahara, Sept. 1905, (No. 539).

Distrib. Hongkong; Tropical Asia, Mascarene islands, and Polynesia.

Observ. A shrubby herb, 40-50 cm. long, decumbent, many-branched; leaves alternate, linear, 5 cm. long, 2-3 mm. broad, shortly petioled, stipules sheath-like, lanceolate, scaly. Calyx 6-7 mm. long, deeply lobed, lobes lanceolate, scaly; pods long, 1½ cm-2 cm. long, 5-jointed, cut into each joint when ripened.

Lespedeza Mich.

Lespedeza macrocarpa Bunge; Franchet Pl. David. p. 94, Forbes et Hemsl. Ind. Fl. Sin. I. p. 182.

Hab. Toroku: Tōhozan, leg. T. Kawakami, (No. 1289).

Distrib. China: Peking, Hupeh.

Observ. Frutex glaber, ramosus. Folia pinnatim trifoliolata, pinnis oblongo-obovatis, apice rotundato-retusis brevissime mucronatis in exsiccato supra fuscis subtus pallido-glaucis reticulato-venosis, terminali 3½ cm. longa, 1½ cm. lata, petiolulo 1 cm. longo, lateralibus terminali conformibus sed minoribus, 2½ cm. longis, petiolulis 2 mm. longis, petiolis 2 cm. longis, stipulis subulatis, scariosis 4 mm. longis, stipellis obsoletis vel minutis. Flores racemoso-paniculati. Calyces campanulati 5 mm. longi pubescentes, 5-fidi, lobis 2-superioribus connatis, 3-inferioribus linearibus vel subulatis 3 mm. longis. Vexillum obovatum 12 mm. longum, 7 mm. latum, apice obtusum basi gradatim angustatum. Alæ lineares 12 mm. longæ, (unguibus tenuibus linearibus 3 mm. longis), supra unguem leviter auriculatæ, laminis 9 mm. longis, 4 mm. latis apice obtusis. Carina angustata incurvata rostrata unguiculata, unguibus 3 mm. longis, laminis circ. 10 mm. longis, 2 mm. latis. Ovarium cylindraceum complanatum 3 mm. longum apice angustatum ad stylum abeuns, 2-ovulatum, pubescens, stylo longo, 10 mm. longo, supra medium incrassato. Legumina complanata, membranacea, reticulato-venosa, uni-sperma.

Lespedeza pubescens Hayata sp. nov. Suffrutex subglaber. Folia alterna trifoliolata, foliolo terminali oblongo utrinque acuto apice breve mucronato, 2½ cm. longo, 1½ cm. lato, lateralibus terminali conformibus sed paulo minoribus, petiolulis 2 mm. longis pubescentibus, petiolis 3 cm. longis subglabris, foliolis exsiccatis supra nigricantibus glabris, subtus pallido-glaucis adpresse pubescentibus. Paniculæ terminales floribundæ, ramis panicularum 7-8 cm. longis, floribus breve pedicellatis, pedicellis 3 mm. longis.

Calyces 4 mm. longi, adpresse pubescentes 5-lobi, (lobis oblongis 2 mm. longis, 2-superioribus connatis, 3-inferioribus distinctis), basi 2-bracteolati, bracteolis ovatis ½ mm. longis. Vexillum 17 mm. longum, unguiculatum, ungue 2 mm. longo, 2½ mm. lato, lamina obovata 9 mm. longa, 6½ mm. lata, apice rotundata vel emarginata basi leviter auriculata; alæ 10 mm. longæ, carina breviores, unguiculatæ, unguibus 4 mm. longis linearibus, laminis longe obovatis 6 mm. longis apice rotundatis basi latere superiore auriculatis; carina navicularis, unguibus 4 mm. longis, laminis, 8 mm. longis 3½ mm. latis. Legumen ignotum.

Hab. Nanto: Mushazan, ad 6000 ped. alt., leg. T. Kawakami et U. Mori, Aug. 1906, (No. 1136); Byōritsu: Bunsuiga, leg. U. Mori, Juli. 1906, (No. 1104).

Somewhat near *L. Oldhami* Miq., but distinguished by the shape of flowers and in many other points. Also near *L. Viatorum* Champ., but differs in having more obtuse lobes of the calyx.

Vicia Linn.

Vicia Cracca Linn.; Forbes et Hemsl. Ind. Fl. Sin. I. p. 184.

Hab. Taitō: Suibi, leg. T. Kawakami et G. Nakahara, Jan. 1906, (No. 776).

Distrib. Europe, N. Africa, Asia, and N. America.

Observ. Scandens, viridis, glabra, striata. Folia sessilia alterna, 12 cm. longa, 5 cm. lata, pinnata 7-9-juga, apice cirrhata cirrhis 3-fidis, pinnis lanceolato-linearibus 2½ cm. longis, 5 mm. latis utrinque rotundatis apice breve aristatis, petiolulis pubescentibus, rhachis glabris, pinnis infimis reflexis, stipulis lanceolatis pubescentibus 6 mm. longis. Flores spicati, spicis axillaribus, 10 cm. longis a medio sursum floriferis. Flores 13 mm. longi,

pedicellis 2 mm. longis. Calyces tubuliformes basi obliqui, supra gibbosi 5-dentati, tubis 3 mm. longis, totiusque latis, dentibus 2-superioribus brevissimis latissimis, 2-lateralibus cuspidatis 1½ mm. longis, dente infimo lineari 2 mm. longo. Vexillum ovatum 13 mm. longum, 6 mm. latum, basi non unguiculatum apice emarginatum; alæ 14 mm. longæ unguiculatæ, unguibus 6 mm. longis linearibus, laminis angustis, 9 mm. longis, 2½ mm. latis, apice rotundatis basi latere superiore auriculatis; carina alis multo brevior navicularis unguiculata, 6 mm. longa, laminis 4 mm. longis, 2 mm. latis apice truncatis basi latere superiore breve auriculatis. Ovarium longe stipitatum, (stipitibus 3 mm. longis), 6-spermum.

Vigna Sav.

Vigna reflexo-pilosa Hayata sp. nov. Rami striati, teretes, reflexo-hispidi, pilis fulvis reflexis. Folia trifoliolata, longe petiolata, late triangularia in ambitu, foliolo terminali rhomboideo-ovato, 8½ cm. longo, 5 cm. lato, apice abrupte acuto, basi rotundato-acuto, margine repandato-integro vel integro, costis et venis utrinque leviter elevatis, subtus pallidiore, utrinque hispidulo, basi trinervio, petiolulo 3 mm. longo, stipellis lanceolatis coriaceis reflexis, 2-4 mm. longis, rhachis 2 cm. longis, foliolis lateralibus terminali conformibus paulo majoribus, oblique ovatis, latere inferiore latioribus, basi truncato-rotundatis, petiolis 7 cm. longis reflexo-pilosis, stipulis oblongis cum auriculis 1 cm. longis, 3 mm. latis, multinerviis acutis, margine pagineque ciliato-pilosis, basi peltato-auriculatis, (auriculis 3 mm. longis, ad extremitatem rotundatis). Racemi axillares 3 cm. longi, longe pedunculati, pedunculis 13 cm. longis, reflexo-pilosis, pedicellis 1 cm. longis, bracteis stipula

conformibus, apice pedicellorum 2-bracteolati, bracteolis lanceolatis 4½ mm. longis, acuminatis, medio carinatis extus brevissime pubescentibus, intus glabris. Calyx late campanulatus 3 mm. longus, breve 2-lobatus, margine denticulato-ciliolatus, lobo superiore latissimo emarginato, labo inferiore 3-lobulato, lobulis triangularibus acutis. Legumina linearia, scabriuscula.

Hab. Kagi: Kishiri, leg. T. Kawakami et U. Mori, Oct. 1906, (1767).

Near *Vigna Catiang*; differs from it by much more hairy leaves and stem. There is, at Kew, a specimen unnamed which is exactly the same as the present plant.

Vigna sinensis Hassk; Walp. Ann. IV. p. 562; Forbes et Hemsl. Ind. Fl. Sin. I. p. 193.

Hab. Nikusui, leg. T. Kawakami. Juli. 1907, (No. 4244).

Distrib. Commonly cultivated in the tropics; perhaps a native in some parts of China, (after Hemsl.).

Vigna stipulata Hayata sp. nov. Scandens, gracillima, strigosa, pilis reflexis 2 mm. longis, ramis spicarum pilosissime tomentosis, pilis strigosis. Folia alterna trifoliolata hispidula, foliolo terminali rhomboideo trilobato, trinervio, 4 cm. longo, 3½ cm. lato, lateralibus terminali conformibus, petiolulis 5 mm. longis stipellatis, stipellis linearibus 7 mm. longis, stipulata, stipulis auriformibus peltatis medio-fixis radiati-nerviis 1 cm. longis 4 mm. latis, apice acutis basi rotundatis. Flores spicati, spicis terminalibus. Legumen lineare 4½ cm. longum, 5 mm. latum, circ. 13-spermum, nigricans, valvis tortuosis, pilis brevibus strigosis. Semina tetragona, angulata 3 mm. longa.

Hab. Dakusui, leg. G. Nakahara, Aug. 1905, (No. 323).

Remarkable for its peltate stipule; leaflets are sometimes entire, sometimes lobed.

Pachyrrhizus Rich.

Pachyrrhizus angulatus Rich.; Hook. f. Fl. Brit. Ind. II. p. 207; Hook. et Arn. Bot. Beech. Voy. p. 184; Forbes et Hemsl. Ind. Fl. Sin. I. p. 194.

Hab. Akō: Tōkō, leg. G. Nakahara, Sept. 1905, (No. 522).

Distrib. South China; Tropics.

Observ. Scandent; leaves trifoliolate, terminal leaflet broadly ovate, twice as broad as long, angulate, abruptly and shortly acute, obtuse at the very end, 10 cm. long, 18 cm. broad, trinerved, stipellate, pale beneath, nearly glabrous, lateral leaflets nearly as the same as the terminal one, but very oblique; flowers on terminal raceme; flowers 2 cm. long; calyx silky-pubescens.

Derris Lour.

Derris elliptica Benth. in Journ. Linn. Soc. IV. Suppl. p. 111; Hook. f. Fl. Brit. Ind. II. p. 243.

Hab. Jinkakurin, leg. T. Kawakami et Y. Shimada, Aprili. 1908, (No. 3769).

Distrib. India, Siam, Malay Archipelago.

Derris oblonga Benth. in Journ. Linn. Soc. IV. Suppl. p. 112; Forbes et Hemsl. Ind. Fl. Sin. I. p. 199.

Hab. Kōtōshō, leg. T. Kawakami et G. Nakahara, 1906, Mart. (No. 1058).

Distrib. South China.

Sophora Linn.

Sophora tomentosa Linn.; Forbes et Hemsl. Ind. Fl. Sin. I. p. 203.

Hab. Kōtōshō, leg. G. Nakahara, Mart. 1906.

Distrib. Very widely dispersed on the sea-shores of the tropics.

Observ. Shrubby, profusely branched, velvety pubescent all over the plant; leaves pinnate, 7-8 juged, imparipinnate, 15 cm. long, leaflets oblong, round at both ends, 3 cm. long, 2 cm. broad, silky pubescent on both surfaces, at length glabrous on the upper surface, pale yellow in a dry specimen; racemes terminal; flowers 1½ cm. long; calyx campanulate, silky pubescent, nearly truncate or shortly dentate.

Gleditschia Linn.

Gleditschia formosana Hayata sp. nov. Ramuli graciles, glauco-rubescentes spinosi. Folia alterna pari-pinnata, in ambitu angustata, 5½ cm. longa, 2 cm. lata, 8-juga, pinnis superioribus majoribus oblique rhomboidalibus vel rhomboideo-oblongis, 13 mm. longis, 6 mm. latis, apice truncatis minute mucronatis basi cuneato-acutis, obliquis latere superiore latioribus margine crenulatis, prope basin latere superiore integris, cætrum crenulatis, oppositis, sessilibus vel brevissime petiolulatis, petiolulis brevissime pilosis, rachibus pilosiusculis, supra sulcatis, pinnis inferioribus superiore conformibus sed paulo minoribus, petiolis brevibus 3 mm. longis. Spinæ ramosæ, supra-axillares, 2 cm. longæ, fulvo-rubescentes. Legumina complanata, lineari-angustata, 21 cm. longa, 2½ cm. lata, fulvo-rubescentia apice acuta, stylis persistentibus coronata, basi

obtusa, glabra, leviter tortuosa. Semina complanata, 1 cm. longa, 8 mm. lata, glabra, lævia nitidula.

Hab. Tenkachiraisha, leg. C. Owatari; S. Kusano, (Fructus!).

The leaves are very much smaller than those of *G. japonica*, and are as small as those of *G. heterophylla* Bunge. This differs from the latter species by straight, but not curved, pods. There is some doubt about this being a species of *Gleditschia*.

Cassia Linn.

Cassia alata Linn.; Hook. f. Fl. Brit. Ind. II. p. 264.

Hab. Akō: Sekisan, leg. G. Nakahara, Oct. 1905, (No. 615).

The only specimen we have is of a single leaf, which is nearly 50 cm. long, abruptly pinnate, pinnæ being quadrangularly elliptical, with parallel sides, round, minutely mucronate apex, truncate base, 12 cm. long, 5 cm. broad, the superior the larger, base oblique, primary veins nearly 80° to the costa, membranaceous. In the imperfectness of the specimen, the determination is rather conjectural.

Acacia Willd.

Acacia Intsia Willd.; Hook. f. Fl. Brit. Ind. II. p. 297.

Hab. Akō: Bongarisha, leg. G. Nakahara, Sept. 1905, (No. 505); Shintiku: Mt. Goshizan, ad 3000 ped. alt., leg. T. Kawakami, Aug. 1906, (No. 1204).

Distrib. Tropical Himalayas, India, Ceylon, Philippines.

Very near *A. pinnata* Willd. As the specimens are all sterile, the determination is rather conjectural.

Albizzia Durazz.

Albizzia procera Benth.; Hook. f. Fl. Brit. Ind. II. p. 299.

Hab. Biyōritsu : Taiko, leg. T. Kawakami et U. Mori, Juli. 1906, (Nos. 1103 et 7150).

Distrib. India, Malay Archipelago, Philippines.

A common *Albizzia* in Formosa. The habit is just like the Japanese *A. Juribrissin*. I myself have seen the plant in Formosa, growing in the hilly regions.

Rosaceæ.

Prunus Linn.

Prunus pogonostyla Maxim. in Mél. Biol. XI. p. 682; Forbes et Hemsl. Ind. Fl. Sin. I. p. 221.

Prunus formosana Matsum. in Tōkyō Bot. Mag. XV. p. 86; Matsum. et Hayata Enum. Pl. Formos p. 118, t. XI.

Distrib. Fokien.

I have compared the present plant with the co-type of *Prunus pogonostyla* Maxim. at Kew, and found that they are quite identical.

Prunus punctata Hook. f. Fl. Brit. Ind. II. p. 317; Forbes et Hemsl. Ind. Fl. Sin. I. p. 221.

Prunus exerocarpa Hemsl. in Ann. Bot. IX. p. 152.

Hab. Tikushiko, leg. S. Nagasawa, Mai. 1907, (No. 655).

Distrib. Eastern India, China : Kwangtung, Hongkong.

Prunus taiwaniana Hayata sp. nov. Rami virgati cortice cinereo-fusco glabro vestiti, lenticellati. Folia hysterantha membranacea, tenuiter pubescentia, vel demum glabrata, oblongo-obovata, 6 cm. longa, 23 mm. lata, apice cuspidato-acuminata, basi cuneato-acuta, margine serrulata, supra glabrata, vel tenuiter pubescentia, subtus ad costas venasque dense ad paginam tenuiter

pubescentia, petiolis 6 mm. longis, pubescentibus, stipulis lineari-lanceolatis, minutis. Flores 5-6-fasciculati, perulati, perulis scariosis rotundatis glabris, pedicellis 1 cm. longis, pubescentibus. Calycis tubus pubescens, urceolato-tubuliformis, 4 mm. longus limbus 5-lobatus, lobis patentibus angustatis, 3 mm. longis acuminatis margine glanduloso-serrulatis. Petala 5, oblonga, 8 mm. longa, 4 mm. lata, apice biloba, lobis 1½ mm. longis obtusis basi acutis. Ovarium ovatum, 1 mm. longum glabrum, stylo 7½ mm. longo, deorsum pauce barbellato sursum glabro, stigmate capitellato. Fructus piciformes 6 mm. longi, 5 mm. lati, apiculati, basi cupulis calycis suffulti, longe pedunculati, pedunculis 2 cm. longis.

HAB. Nantō : Musha, leg. G. NAKAHARA, Feb. 1907.

Somewhat like *Prunus pendula* MAXIM., but distinguishable by the smaller flowers with narrower and more deeply emarginate petals.

Spiræa LINN.

Spiræa formosana HAYATA sp. nov. Rami recti, fulvescentes, dense pubescentes. Folia oblonga vel oblongo-ovota, 4 cm. longa, 2½ cm. lata, apice acuta, basi rotundato-acuta, margine duplicato-serrata, serrulis apice callosis, costis et venis primariis supra impressis, subtus elevatis, venis primariis utrinque latere 5, subrectis ascendentibus, ad apicem serrularum attingentibus, utrinque subglabrata subtus pallido-glauca, petiolis 2 mm. longis. Cymæ terminales 5 cm. longæ, 8 cm. latæ, ramis et pedicellis pubescentibus, bracteolis subulatis. Calyx late campanulatus 1½ mm. longus, 3 mm. latus, 5-lobatus, lobis patentibus triangularibus extus pubescentibus intus glabris. Petala 5, late rotundata, apice rotundata, vel leviter emarginata, basi obtusa. Stamina 20, longe exserta 4 mm. longa ad faucem calycis inserta.

Disci glandulæ circ. 10, ad faucem calycis insertæ, late angustatæ, ½ mm. longæ. Carpella 5, subfusiformia 2½ mm. longa latere interiore hirsuta, apice stylis persistentibus 1 mm. longis coronata.

Hab. Randaisan, leg. T. Kawakami, et U. Mori, Aug. 1908.

Near *Spiræa japonica* Linn.; but differs from it in having duplicately serrated leaves and less hairy smaller calyx; also near *Spiræa bella*, from which this differs in ovate acuminate or acute leaves.

Var. **brevistyla** Hayata n. v. Calycis lobi circ. obsoleti, vel obtusissimi. Carpella sub maturitate ovoidea 2 mm. longa, apice brevissime rostrata, vel rostris obsoletis, glabrata, cætrum ut typicæ.

Hab. in Monte Morrison, leg. T. Kawakami et U. Mori, Oct. 1906, (No. 1801).

The present variety differs from the type in having much shorter carpels, nearly obsolete styles, and very short calyx lobes.

Spiræa morrisonicola Hayata, sp. nov.

Spiræa sp. Hayata Fl. Mont. Formos. p. 79.

Suffrutex nanus, glaber. Folia alterna subsessilia ovata apice obtusa basi acuta vel cuneata 1½ cm. longa medio sursum denticulata basin versus integra, venis supra impressis subtus prominentibus. Fructus in cymas racemosas terminales dispositi. Carpella 2 mm. longa breve rostrata.

Hab. in Monte Morrison, ad 12000 ped. alt., leg. T. Kawakami et U. Mori, Oct. 1906, (Nos. 2233 et 2296).

The present plant is distinguished from other species of the genus by its small and glabrous form.

Rubus Linn.

Rubus conduplicatus Duthie in Herb. Kew.

Hab. Shintiku : Taihei, leg. T. Kawakami et U. Mori, Juni. 1906, (No. 1418); Akō : Taigiorinye, leg. T. Kawakami, (No. 2891); Randaisan, Mart. (No. 3526).

Compared with the type of the species at Kew.

Rubus fasciculatus Duthie in Herb. Kew.

Hab. Taitō : Koshiron, leg. T. Kawakami et U. Mori, Aprili. 1907, (No. 2842).

Compared with the type at Kew.

Rubus Morii Hayata sp. nov. Ramuli fusco-purpurascentes, teretes, pubescentes, minute aculeolati, aculeis 1 mm. longis. Folia cordato-ovata, 6 cm. longa, 4½ cm. lata, apice cuspidato-acuminata, (cuspidibus 1½ cm. longis), basi rotundata, margine lobulata, lobulis serratis, serris cuspidatis, trinervia, vel pinninervia, supra scabra, minute parce lepidota, subtus pallidiora, petiolis 1 cm. longis, lævibus, stipulis oblique elongato-oblongis 12 mm. longis, 5 mm. latis, apice acutis margine laciniato-dentatis, scabro-lepidotis. Flores racemosi, racemis terminalibus 10 cm. longis, lepidotis, bracteis acuminato-ovatis, laciniatis. Calyx extus dense lepidotus, (fructifer reflexus), cupula valde reflexa, 3½ mm. in radio, intus profunde reticulato-sulcata, lobis acuminato-triangularibus 9 mm. longis, ad basin 4½ mm. latis, extus lepidotis, intus breve pubescentibus. Petala persistentia, obovata, denticulata, deorsum integra, 5 mm. longa, 2½ mm. lata, basi cuneato-angustata. Stamina uniseriata, filamentis complanatis 2½ mm. longis basi rubro-glandulosis. Carpophora globosa 1½ mm. in diametro, barbata, stipitata, stipitibus 1½ mm. longis, barbatis. Drupeolæ a latere compressæ 1½ mm. longæ, 1 mm. latæ, reticulato-rugulosæ.

Hab. Taitō : Chakankei, leg. T. Kawakami et U. Mori, 1908, Jan. (No. 4518).

Remarkable for the cupules which are very much reflexed and deeply reticulately furrowed.

Rubus Kawakamii Hayata sp. nov. Rami fusco-rubescentes, vel fuscentes, graciles, primum tomentis mollissimis obtecti, demum glabrati, rectiusculi, brevissime aculeatis, aculeis 1 mm. longis basi dilatatis. Folia longe petiolata, oblonga, vel oblongo-ovata, vel elliptico-ovata, 12 cm. longa, 5 cm. lata, apice acuminata, basi rotundato-ovata, margine obscure remoteque serrulata vel duplicato-serrulata, valde mutabilia, basi obscure trinervia, costis venisque supra tenuiter impressis, subtus elevatis, venis primariis lateralibus cum nervis basilaribus utrinque latere 7-8, circ. parallelis a costis angulo 30° divergentibus, supra glabra subtus tomentis mollissimis obtecta, demum glabrata, subtus ad costas remote minuteque aculeata, petiolis gracilibus 2½ cm. longis, supra canaliculatis subtus aculeatis, stipulis caducissimis non visis. Cymæ umbellatæ paucifloratæ, floribus 5-6, longe pedicellatis, pedicellis 2 cm. longis, dense pubescentibus, basi bracteatis, bracteis ovatis 5 mm. longis. Calyces campanulati, extus dense breveque villoso-pubescentes minute aculeati, (aculeis ¼ mm. longis apice acutis vel dilatato-truncatis), intus brevissime villoso-pubescentes, cupulis 9 mm. in diametro, lobis ovatis 9 mm. longis, apice subto acuminatis, margine laciniatis a medo deorsum integris. Petala 5, obovata, utrinque brevissime villosa, lobos calycis ⅓-plo in longitudine æquantia. Carpophora dense barbata. Carpella præmatura oblonga 1 mm. longa, recurvata, stylis longiusculis 5 mm. longis basi hirsutis. Drupeolæ sub maturitate obovatæ 3 mm. longæ, 2½ mm. latæ.

Hab. Randaizan, leg. B. Hayata et U. Mori, Aug. 1908, (No. 7047).

Near *R. malifolius* FOCKE ; but differs from it in having more acute or even acuminate and usually trinerved leaves and cymose or even umbellate flowers. In *R. malifolius*, the leaves are pinninerved and the flowers are in racemes. The present *Rubus* is also distinguishable from *R. sepalanthus* FOCKE by tri-nerved leaves and umbellately contracted racemes. This is also near *R. Swinhœi* HANCE, which differs from this plant, in having quite glabrous leaves, and not prickly pedicels and calyx.

Rubus nantœnsis HAYATA sp. nov. Rami teretes, fusco-fulvescentes, flexuosi, sursum tomentis mollissimis obtecti, demum subglabrati, aculeis minutis dispersis, remote foliati. Folia longe petiolata, 3-5-lobata, late ovata in ambitu, 8 cm. longa, 6 cm. lata, apice acuta basi truncato-cordata, vel truncato-rotundata, margine irregulariter serrulata, lobo terminali in longitudine folium ½-plo æquante, apice acuto, basi leviter contracto, subovato 5 cm. longo 3 cm. lato, sinibus inter lobos rotundatis, lobis lateralibus minoribus, lobis basilaribus minimis, basi 5-nervia, supra reticulato-papilloso-rugosissima, costis venis et venulis supra leviter impressis, demum subglabrata, subtus indumentis densis albo-rubescentibus obtecta, costis venis venulisque subtus prominente reticulate elevatis, petiolis 3½ cm. longis, aculeolis minutis remote dispersis, vel lævibus, stipulis angustatis 12 mm. longis obscure denticulatis vel integris. Flores racemosi, racemis axillaribus, brevioribus, 1½ cm. longis, molle tomentosis, pedicellis brevibus 4 mm. longis, stipulis latissimis 3 mm. longis, 4 mm. latis, margine laciniatis, extus tomentosis intus glabris, 2-bracteolatis, bracteolis 2 mm. longis digitato-laciniatis. Calyces campanulati, 5-lobati, extus dense intus tenuiter pubescentes, lobis late angustis, 5 mm. longis, 3 mm. latis, apice subito acuminatis. Carpophora semiglobosa,

barbata, carpellis cum stylo 5 mm. longis, stigmatibus capitatis.

Hab. Nantō: Bikei, leg. T. Kawakami et U. Mori, (No. 3287).

Near *R. rugosus* Sm.; but differs from it by the smaller flowers and more acutely lobed leaves.

Rubus randaiensis Hayata sp. nov. Ramuli læves, molle tomentosi, teretes, fusco-fulvescentes. Folia longe petiolata, 5-lobata, subcordata in ambitu, apice obtuso-acuta, basi cordata, 10 cm. longa, 8 cm. lata, margine lobulato-serrata, lobulis serratis, lobo terminali ovato, folium ½-plo æquante, 6 cm. longo, 3½ cm. lato, sinibus inter lobos obtusis, lobis lateralibus minoribus, cum lobis basilaribus minimis mutabillimis, rotundatis, 5-nervia, supra pubescentia rugosa, subtus dense albo-floccoso-tomentosa, venis venulis reticulato-elevatis, petiolis 4 cm. longis villoso-tomentosis, stipulis majoribus oblongo-ovatis, 18 mm. longis 5 mm. latis, basi latioribus caulem semi-amplectantibus. Racemi breves pauci-florati, axillares vel terminales, floribus bracteatis, bracteis magnis alabastrum floris involventibus, caducissimis, rotundatis, 1½ cm. longis totiusque latis, apice brevissime pauce dentato-laciniatis, extus hirsutis, intus glabris, 2-bracteolatis, bracteolis oblique rotundato-obovatis 8 mm. longis, 6 mm. latis, apice rotundatis, pauce brevissime dentatis, pedicellis brevibus 5 mm. longis. Calyx majusculus extus villoso-tomentosus, intus brevissime pubescens, cupula concava, lobis acuminato-triangularibus apice acuminatis laciniato-serratis, serris 3 mm. longis vel subintegris, 14 mm. longis, 7 mm. latis. Petala late rotundata, apice rotundata brevissime-mucronata, basi acuta. Stamina 5 mm. longa, antheris oblongis, carpophora semi-globosa, longe-barbata, carpellis circ. 1 mm. longis, stylis 7 mm. longis, stigmatibus 2-lobatis.

Hab. Randaisan, leg. B. Hayata et U. Mori, Aug. 1908, (No. 7001).

Near *R. diffusus*, but differs from it in having more deeply lobed leaves and not prickly branches and petioles. Also near *R. hainanensis* Focke (in sched.) from which the present plant is easily distinguishable by elongated denticulate stipules.

Rubus retusipetalus Hayata sp. nov. Ramuli graciles glabri, angulato-striati, spinosi, spinis longitudinaliter complanatis, basi dilatatis, recurvis, 2 mm. longis. Folia ovato-cordata, vel oblongo-ovata, 9 cm. longa, 5 cm. lata, apice acuto-acuminata, basi cordata vel truncato-cordata, margine serrata, serris cuspidatis, membranacea, obscure trinervia, vel pinnatinervia, venis lateralibus primariis 6-7, curvato-rectis, a costis angulo 40 divaricatis, supra glaba, subtus glaucissima, ad costas et venas aculeata, petiolis 3 cm. longis, supra sulcatis, infra aculeatis, stipulis lineari-filiformibus 1 cm. longis, 1 mm. latis, prope basin petiolorum insertis. Flores ad axillas foliorum superiorum, vel terminales, racemosi vel solitarii, longe pedunculati, pedunculis 3 cm. longis, bracteis lineari-filiformibus. Calyx subplanus, extus glaber, intus villoso-pubescens, cupula subplana 8 mm. in diametro, lobis acuminato-oblongis, cum acuminibus 1 cm. longis, acuminibus teretibus 4 mm. longis, margine tomentosis. Petala elongato-obovata, 1 cm. longa, 5 mm. lata, apice rotundato-emarginata, basi cuneato-angustata, deorsum tenuiter hirsuta. Carpellum $\frac{1}{2}$ mm. longum, glabrum, stylis 2 mm. longis basi hirsutis, stigmatibus oblique capitatis. Carpophora subplana, tomentosa.

Hab. Tōyen : Kōtōsan, leg. T. Kawakami et U. Mori, Mart. 1907, (No. 2675).

Near *R. conduplicatus* Duthie, but differs from it in having more or less retused or emarginate petals.

Rubus shinkœnsis Hayata sp. nov. Rami teretes, subglabrati, striati spinosi, spinis brevibus 2 mm. longis, recto-curvis, rubescentibus basi dilatatis, cicatricibus spinarum oblongis, 4 mm. longis, 1 mm. latis, ramulosi, ramulis divaricatis rectis, pubescentibus, alabastris foliorum dispositis, alabastris perulatis, perulis ovatis, integris, obscure dentatis vel leviter laciniatis subglabratis, apice molle pubescentibus 1 cm. longis vel brevioribus. Folia elongato-ovata, 7 cm. longa, 3½ cm. lata, apice acuminata, basi leviter cordata, serrulata vel duplicato-serrulata, chartaceo-membranacea, trinervia, lobo centrali majore ovato-acuminato, lobis basilaribus minoribus, apice acutis basi latere inferiore rotundato-acutis nervo centrali quam iis basilaribus 3-plo longiore, nervis basilaribus a centrali angulo 45° divergentibus, utrinque ad nervos pubescentia, cæterum glabrata, petiolis 14 mm. longis, canaliculatis pubescentibus, stipulis prope basin petiolorum insertis, lanceolato-acuminatis 4 mm. longis. Ramuli floriferi breviores, 2-3 cm. longi, floribus terminalibus, pedicellis 4 mm. longis pubescentibus. Calyx extus dense pubescens, intus glaber, lobis ovato-triangularibus 6 mm. longis, acuminatis, acuminibus obtusis. Petala ovata, 7½ mm. longa, 4 mm. lata, apice obtuso-acuta, basi breve cuneata, reticulato-nervosa. Stamina filamentis complanatis 4 mm. longis, apice contractis filiformibus. Carpophora oblonga, elevata, glabra, carpellis hirsutis, stylis filiformibus 1½ mm. longis, basi hirsutis, stigmatibus capitatis.

Hab. Shinkō: Kakurei, leg. T. Kawakami et U. Mori, Mart. 1907, (No. 2652).

This plant is near *R. conduplicatus* Duthie; but differs from

it in having solitary flowers. Also very near *R. incisus* THUNB. from which the present *Rubus* differs in having more acuminate leaves and broader lobes of calyx.

Rubus sorbifolius MAXIM. ; FOCKE in ENGL. Jahrb. XXIX. p. 391.

HAB. Formosa, HENRY, in Herb. Kew.

DISTRIB. Japan : Kiu-shiu ; Himalaya, Central China.

Rubus taitœnsis HAYATA sp. nov. Rami tenuiter pubescentes, teretes, fusco-purpurascentes, breve spinulosi, spinis 4 mm. longis, transverse recto-recurvis, ramulis molle pubescentibus. Folia, simplicia, coriacea, ovata in ambitu, basi leviter cordata, apice acuminata, 5½ cm. longa, 4½ cm. lata, 3-lobata, lobo centrali elongato-ovato, 3½ cm. longo, 2 cm. lato, apice acuminato, basi leviter contracto, margine leviter dentato-serrulato, dentibus serrulatis, ad sinus inter lobos dentata, lobis basilaribus ovatis apice acutis, basi latere inferiore rotundato-acutis, trinervia, nervo centrali 5½ cm. longo, nervos laterales 2-plo in longitudine superante, nervis lateralibus 2½ cm. longis, a nervo centrali angulo 45° divergentibus, supra tenuiter pubescentia demum glabrata, subtus glauca, ad nervas et venas pubescentia venulis supra impressis subtus elevatis, petiolis 1 cm. longis, pubescentibus, stipulis ad basin petiolorum insertis, lanceolatis pubescentibus 7 mm. longis. Flores terminales solitarii, pedunculis 1 cm. longis villoso-pubescentibus. Calyces campanulati, 2-2½ cm. in diametro, utrinque villoso-pubescentes, aculeati aculeis minutis 1 mm. longis parce obtecti, 5-lobati, lobis triangulari-acuminatis 6-12 mm. longis, 4 mm. latis. Fructus (syncarpium) conico-globosus, 1 cm. in diametro. Drupeolæ 2 mm. longæ, cum stylis persistentibus 2 mm. longis hirsutæ.

Hab. Taitō: Shinsuikei, leg. T. Kawakami et U. Mori, 1907, Aprili. (No. 3141).

The present *Rubus* is near *R. conduplicatus* and *R. incisus*, but differs from both in having prickled calyx.

Fragaria Linn.

Fragaria vesca Linn. var. **minor** Hayata n. n.

Fragaria sp. Hayata Fl. Mont. Formos. p. 82. Folia et flores quam typica valde minores, cæterum ut typicæ. Folia trifoliolata, foliolis rhomboideis basi cuneatis dentatis, terminali 1 cm. longo 8 mm. lato. Flores 7 mm. in diametro. Petala orbicularia apice rotundata, basi abrupte contracta, 3½ mm. in diametro.

Hab. Randaizan, leg. U. Mori et B. Hayata, Aug. 1908; Ganzan, in montibus Morrison, ad 9141 ped. alt., leg. S. Nagasawa, Oct. 1906, (No. 739).

Differs from the type by the rounded petals which are strongly contracted at the base.

Rosa Linn.

Rosa morrisonensis Hayata sp. nov.

Rosa sp. Hayata Fl. Mont. Formos. p. 85.

Suffrutices spinosissimi, aculeis albidis rectis subulatis, ramis patentibus gracilibus. Folia pinnata 7-11-foliolata, glabra, ambitu elliptica, cum petiolis 5 cm. longa, 2½ cm. late, petiolis gracilibus minutissime aculeolatis, foliolis subsessilibus late obovatis vel subrotundatis 13 cm. longis 7 mm. latis medio denticulatis apicem versus dentatis, dentibus acutis, stipulis petiolo adnatis apice liberis acutis glabris glanduloso-serrulatis, serrulis argutis. Flores secus ramulos quasiracemosi, e gemmis solitarii breviter pedun-

culati, pedunculis 1½ cm. longis apice ad calycis tubum abeuntibus. Calycis tubi post anthesin pyriformes 8 mm. longi apice constricti basi attenuati, lobis integris lanceolatis longe acuminatis intus lanato-pubescentibus extus parce pubescentibus marginibus parcissime glandulosis. Petala ignota. Carpella 4-5, trigona 5 mm. longe apice hirsuta, stylis persistentibus.

Hab. in monte Morrison, ad 12000 ped. alt., leg. T. Kawakami et U. Mori (No. 2293), ibidem, leg. S. Nagasawa, Nov. 1905, (Nos. 572 et 618).

The present *Rosa* is near *R. Willmottiæ* Hemsl. and *R. Webbiana* Wall. ; but differs from both in having larger lobes of calyx and more acutely serrated leaves. Also near *R. xanthina* Lindl. ; but quite separable by the narrower sepals and more acutely serrated leaves.

Pyrus Linn.

Pyrus aucuparia var. **randaiensis** Hayata v. n. Ramuli validiusculi, cinereo- vel fusco-purpureo-rubescentes, cicatricibus annuliformibus foliorun transverse notati, et lenticellis globosis minitis dispersis. Folia pinnata, angustato-elliptica in ambitu, 13 cm. longa, 4 cm. lata, pinnis lateralibus 8-9-jugis, inferioribus et superioribus brevioribus, mediocribus longioribus, pinnis sessilibus, infimis oblongis, 2 cm. longis 12 mm. latis, mediocribus oblongo-angustatis, 4½ cm. longis, 12 mm. latis, apice acuminatis basi obliquo rotundatis, latere superiore obtusis, latere inferiore longioribus rotundato-cordatis, costis supra impressis, subtus elevatis venis lateralibus supra impressis subtus elevatis, ad costas et venas subtus hirsutis, utrinque glabris subtus pallidis margine argutoserrulatis, serrulis ascendentibus, acuminatis 1-2 mm. longis,

pinna terminali oblongo-obovata, 3 cm. longa, 13 mm. lata, interjugis 1 cm. longis, brevissime stipellatis, stipellis subulatis, rhachis alatis supra glabris sulcatis, subtus ferrugineo-hirsutis, petiolis 4 cm. longis, supra glabris alatis, sulcatis, basi dilatatis, stipulis linearibus 9 mm. longis basi ad petiolum connatis, crassiusculis. Alabastrum foliorum acuto-ovatum, perulis late ovatis, apice rotundato-apiculatis, glabris. Cymæ terminales 8 cm. longæ, 9 cm. latæ, pedunculis et pedicellis subglabratis, vel pauce hirsutis, rubescentibus, lenticellis elongatis obtectis, pedicellis 8 mm. longis. Fructus globoso-pyriformes, 5 mm. in diametro, generalliter 4 rarius 3- vel 5-loculares apice calycis lobis persistentibus coronati, lobis triangularibus obtusis.

Hab. Randaizan, leg. U. Mori et B. Hayata, 1908, Aug. (No. 7027).

There is nothing like this at Kew. It is easily distinguishable by the minutely and very shapely toothed leaves.

Pyrus aucuparia var. **trilocularis** Hayata n. v. Fructus subglobosi circ. 1 cm. in diametro, 3-loculares, loculis 1-2-spermis, vel reductu 1-spermis. Semina oblongo-compressa, 3½ mm. longa, rubra. Cætrum ut typicæ.

Hab. Seizan, leg. S. Nagasawa, Nov. 1905, (No. 576).

Very like the type, but differs in having 3-celled fruit.

Pyrus Kawakamii Hayata sp. nov. Ramuli fusco-purpurascentes, glabri, longitudinaliter rugulosi, secus apicem cicatricibus annularibus foliorum transversim notati. Alabastrum foliorum cylindricum, 12 mm. longum, perulis imbricatis, triangularibus, obtuso-acutis, margine ciliatis. Folia ad apicem ramulorum approximatim 3-4-sub-fasciculata, longe petiolata, coriacea, patentia,

late oblonga, vel ovato-oblonga, 7 cm. longa, 5 cm. lata, apice breve cuspidato-acuta, vel acuta, basi acuta vel obtusa, margine crenulato-serrulata, serrulis obtusis, utrinque glabra, venis tenuiter elevatis, subtus pallidiora, petiolis 3 cm. longis. Fructus racemosi, racemis brevibus 1 cm. longis, pedicellati, pedicellis longiusculis 2 cm. longis. Drupæ globosæ 9 mm. in diametro, exsiccato rubescentes, parce punctatæ, (punctis subalbicantibus minutis globosis), 2-3-spermæ. Semina quadrantiformia dorso convexa, 4 mm. longa, 2 mm. lata utrinque obtusa, fusco-rubro-purpurascentia.

HAB. Nantō, leg. T. KAWAKAMI, Nov. 1906, (No. 4705).

Very like *P. sinensis* from which this is distinguishable by the leaves which are acute on the both ends. Also near *P. Prattii* HEMSL. and *P. baccata;* but differs from both in having much smaller fruit and oblong leaves, acute at the both ends.

Pyrus formosana KAWAKAMI et KOIZUMI sp. nov. Ramuli validiusculi longitudinaliter rugosi, fusco-purpurascentes, vel cinerascentes, cicatricibus foliorum transversim notati. Alabastrum foliorum ovatum 5 mm. longum, perulis triangulo-acutis, glabris. Folia ad apicem ramulorum 2-3-sub-fasciculata, patentia, membranaceo-coriacea, elongato-oblonga, vel ovato-oblonga, 9-10 cm. longa, 4 cm. lata, apice acuta vel acuminata, basi acuta, vel rotundato-acuta, margine irregulariter serrulata, serrulis obtusis, utraque glabra, subtus pallidiora, venulis transversim utraque tenuiter elevatis, venis primariis utraque latere 9-10, supra inconspicuis, subtus elevatis, costis supra sulcatis, subtus prominentibus, petiolis 3 cm. longis, supra sulcatis, glabris. Fructus maliformes, depresso-globosi 3 cm. longi 3½ cm. lati, sub maturitate flavescentes.

HAB. Rinkiho, leg. N. KONISHI, 1904, Feb. (No. 7).

This differs from *P. Malus* in the serration and the shape of the leaves.

Cotoneaster Medik.

Cotoneaster formosana Hayata sp. nov. Ramuli erecti rubro-fuscentes cinereo-pubescentes demum glabrati interdum spinosi. Folia 3-5 ad apicem ramulorum brevissimorum aggregata, breve petiolata oblongo-obovata, 23 mm. longa, 12 mm. lata, apice truncata emarginata, basi truncata, integerrima cano-pubescentia, supra demum glabrata, subtus pallidiora, pubescentia, petiolis 4 mm. longis. Flores albi ?, 7 mm. in diametro corymbosi, (corymbis bracteatis), ada xillas foliorum superiorum, vel terminales. Calyces 4½ mm. in diametro, lobis 5, triangularibus pilosiusculis, tubis intus pilosissimis. Petala 5, orbicularia 3-4 mm. longa, totiusque lata, apice emarginata, basi leviter contracta. Stamina ∞. Carpella 5, pilosissima, stylis glabris.

Hab. Taitō: Tabari, leg. G. Nakahara, Juni. 1906, (No. 741).

Cotoneaster Koizumii Hayata sp. nov. Rami cortice cinerascente longitudinaliter rugoso obtecti, ramulis divaricatis apice spinosis, dense pubescentibus, pilis mollissimis, cum ramulis brevissimis foliosis alternatim suffultis. Folia ad apicem ramulorum brevissimorum alternatim 2-3-fasciculata, (ramulis foliosis brevissimis ½ mm. longis) obovata, vel spathulato-obovata, 18 mm. longa, 11 mm. lata, apice rotundato-emarginata, brevissime apiculata, basi cuneato-obtusa, integerrima, coriacea supra subnitida, subtus pallidiora, exsiccato utraque rubescentia, petiolis 3 mm. longis. Cymæ ad apicem ramulorum brevissimorum lateralium terminales, sessiles, 2½ cm. longæ, 3 cm. latæ, glabratæ. Drupæ

adpresso-globosæ, 4 mm. longæ, 5 mm. latæ. Calyces fructiferi suburceolato-globosi, lobis persistentibus late triangularibus, pyrenes subincludentes. Pyrenes 5, apice nudæ, rotundato-quadrantiformes $2\frac{1}{2}$ mm. longæ, $1\frac{3}{4}$ mm. latæ, apice stylis persistentibus apiculatæ, fusco-rubescentes.

Hab. Pinan, Oct. 1896, (A. 26).

The present plant is very distinct from any other species of the genus, in having obovate or even spathulate leaves which are emarginate at the apex. From *C. formosana*, this differs in the inflorescence on the shortened branchlets standing nearly alternately on a lateral branch.

Cotoneaster taitœnsis Hayata sp. nov. Frutex. Rami valde cinereo-fuscentes, cortice subnitido longitudinaliter rugoso obtecti, ramulis divaricatis breve pauceque pubescentibus spinosis, spinis simplicibus 1 cm. longis. Folia ad ramulos brevissimos laterales approximatim alternatimque disposita, vel ad apicem ramulorum brevissimorum 3-4-fasciculata, obovato-spathulata, vel spathulata, $3\frac{1}{2}$ cm. longa 1 cm. lata, apice truncato-emarginata, brevissime apiculata, margine integerrima, tenuiter pubescentia, demum glabrata, basi cuneato-angustata, coriacea, supra subnitida, subtus pallidiora, exsiccato rubescentia, petiolis 3 mm. longis. Fructus paniculati, paniculis ad apicem ramulorum brevissimorum terminalibus. Drupæ globosæ $\frac{1}{2}$ cm. in diametro 5-pyrenæ, pyrenibus quadrantiformibus osseis, $3\frac{1}{2}$ mm. longis, apiculatis.

Hab. Taitō, leg. K. Miyake, 1899, Dec.

This species is very like *C. formosana*, but differs from it in the inflorescence.

Photinia Lindl.

Photinia niitakayamensis Hayata sp. nov.

Photinia Notoniana Wight et Arn. var. *eugenifolia* Koizumi, (non. Hook.) in Tōkyō Bot. Mag. XXIII. p. 170.

Photinia integrifolia Matsum. in Tōkyō Bot. Mag. XII. p. 55; Matsum. et Hayata Enum. Pl. Formos. p. 130, (non. Lindl.)

Rami fusco-cinerascentes, lenticellis globosis minutis notati, longitudinaliter rugulosi, ramulis tenuiter tomentosis vel pubescentibus foliosis. Folia oblongo-oblanceolata, vel oblanceolata, chartacea, 7½ cm. longa, 2½ cm. lata, apice acuto-acuminata, breve aristata, vel calloso-aristata basi obtusa vel acuta, integra supra ad costas et venas tenuiter hirsuta, demum glabrata, costis supra planis vel tenuiter impressis, subtus prominentibus, venis lateralibus utrinque tenuissimis, petiolis 2½ cm. longis teretibus tenuiter hirsutis, basi abrupte dilatatis, stipulæformibus. Flores cymosi, cymis terminalibus 5 cm. longis totiusque latis, hirsutis. Fructus globosi 8 mm. longi, 5-loculares, carpellis hirsutis leviter exsertis, calycis lobis triangularibus 1 mm. longis, totiusque latis hirsutis persistentibus.

Hab. Ganzan, leg. S. Nagasawa, 1905, Oct. (No. 551).

The present plant was identified with *P. integrifolia* Lindl. by Prof. J. Matsumura in Tōkyō Bot. Mag. XII. p. 55, and was corroborated by myself in Enum. Pl. Form. p. 130. It was finally identified with *P. Notoniana* Wight et Arn. var. *eugenifolia* Hook. by Mr. G. Koizumi in Tōkyō Bot. Mag. XXIII. p. 170. While studying here at Kew, I have examined the types of the species and variety and found that they are not at all in accord with the present plant. They differ from our plant in many points, but especially in having much larger and thicker

or even coriaceous leaves. The present plant is distinct from any other species of the genus at Kew, and I think this may be a species not yet described.

Photinia serrulata LINDL. in Bot. Mag. t. 2105 ; FORBES et HEMSL. Ind. Fl. Sin. I. p. 263.

HAB. Taitō : Daishinzan, ad 6000 ped. alt., leg. T. KAWAKAMI et U. MORI, Jan. 1908, (No. 4517).

DISTRIB. Chekiang, Fokien, Hupeh.

So far as external comparison is concerned, the present plant is quite referable to this species. Although my plant has no flowers but only young fruit, it is in general appearance exactly identical with the LINDLEY's species.

Photinia taiwanensis HAYATA sp. nov.

Photinia variabilis HEMSL. (pro parte) in FORBES et HEMSL. Ind. Fl. Sin. I. p. 263 ; MATSUM. et HAYATA Enum. Pl. Formos. p. 130.

Photinia arguta var. *membranacea* KOIZUMI in Herb. Tōkyō.

Rami cinereo-fuscentes, vel fusco-purpurascentes, longitudinaliter rugulosi, lenticellis minutis obtecti, ramulis gracilibus foliosis albo-tomentosis. Folia obovato-oblonga, vel oblanceolata, 8 cm. longa, 3 cm. lata, apice cuspidato-acuminata, basi acuta, sursum minute serrulata, serrulis minutis, deorsum remote serrulata prope basin integra, chartacea, utraque pagine indumentis mollissimis primum obtecta, demum subglabrata, costis et venis tenuissimis, petiolis 7 mm. longis. Flores breve umbellati, cymosi, cymis brevibus terminalibus 2 cm. longis totiusque latis, pedicellis 1 cm. longis bracteis subulatis 2 mm. longis. Calyx campanulatus glaber, $2\frac{1}{2}$ mm. longus, lobis patentibus, triangularibus vel late rotundatis,

mucronatis, 1 mm. longis, 1½ mm. latis. Petala 5, rotundata, 3½ mm. longa totiusque lata, apice rotundato-truncata, prope basin subito cuspidato-obtusa, vel acuta, margine apice sub-emarginata vel non emarginata. Stamina circ. 15, filamentis basi leviter dilatata. Ovarium sub-inferius apice albo-tomentosum, 2-loculare, stylis 2, toto longitudine connatis, vel apice leviter distinctis, basi hirsutis, stigmatibus oblique capitatis. Fructus elliptico-pyriformes, 6 mm. longi, 4½ mm. lati, longe pedunculati, pedunculis 4 mm. longis.

Hab. Taihoku, leg. T. Makino, Nov. 1896.

The present plant is included in *P. variabilis* by W. B. Hemsley in Ind. Fl. Sin. I. p. 263. While studying here at Kew, I have examined all specimens included under the same name by this authority, and found that the Formosan specimens are very distinct from any of the other forms of the species collected in continental China. I think, therefore, the present plant should be regarded as a species distinct from *P. variabilis*. It is near *P. arguta*, but differs in having more minutely toothed leaves.

Prinsepia Royle.

Prinsepia utilis Royle; Hook. f. Fl. Brit. Ind. II. p. 323.

Hab. Ganzan, ad 9141 ped. alt., leg. S. Nagasawa, Oct. 1905, (No. 562); in monte Morrison, ad 8000 ped. alt., leg. T. Kawakami et U. Mori, Oct. 1906, (No. 2025); in Montibus Centralibus, leg. T. Kawakami et U. Mori, ad 12000 ped. alt., Nov. 1906, (No. 1855).

Distrib. Temperate Himalayas.

Observ. Rami virides glabri spinosi, spinis alternis 1½ cm. longis axillaribus solitariis. Folia viridia, alterna, petiolata, oblongo-lanceolata 4½ cm. longa, 1½ cm. lata, subintegra vel obscure sub-

crenulata apice acuta breve aristata, basi breve attenuata, petiolis 7 mm. longis. Flores breve racemosi vel 3-5-fasciculati ; racemis axillaribus 2-3 cm. longis, paucifloratis, pedicellis 1 cm.-2 cm. longis. Flores 1½ cm. in diametro. Sepala 5, valde inæqualia 2-exteriora minora rotundata 2 mm. longa crassiucula, 3-interiora majora rotundata 4 mm. longa, margine scariosa. Petala 5, ovato-rotundata, 6 mm. longa, 5 mm. lata, apice rotundata, basi breve obtusa. Stamina ∞ ad marginem discorum inserta, filamentis 2 mm. longis, antheris 2-locularibus, connectivis latioribus apice emarginatis. Ovarium globosum 1 mm. longum, stylo 2-3 mm. longo laterali spiraliter recurvo vel ascendente, stigmate capitellato-peltato. Fructus ignotus.

Very interesting genus closely allied to Celastrineæ.

Saxifrageæ.

Astilbe Ham.

Astilbe longicarpa Hayata n. n.

A. chinensis var. *longicarpa* Hayata Fl. Mont. Formos. p. 86.

As the present plant is very remarkable for its flowers which are all turned on the same direction on a spikelet, it should be raised up to a specific rank, distinct from *A. chinensis*. There is nothing like this at Kew.

Astilbe macroflora Hayata Fl. Mont. Formos. p. 86.

The present plant is near *A. rubra* Hk. et T., but differs from it in having smaller carpels and much broader petals.

Schizophragma Sieb. et Zucc.

Schizophragma hydrangeoides S. et Z. var. **Fauriei** Hayata n. n.

Schizophragma Fauriei Hayata in Matsum. et Hayata Enum. Pl. Formos. p. 131.

I have examined the type of *S. integrifolia* Franchet in the Herbarium at the Jardin des plantes at Paris, and found that my plant is quite distinct from Franchet's species. The latter species may be another variety of *S. hydrangeoides* S. et Z.

Cardiandra Sieb. et Zucc.

Cardiandra formosana Hayata in Tōkyō Bot. Mag. XX. p. 54; Matsum. et Hayata Enum. Pl. Formos. p. 132.

Cardiandra sinensis Hayata Fl. Mont. Formos. p. 92, (non Hemsl.).

The present plant is described by myself in Tōkyō Bot. Mag. XX. p. 54, and afterwards is reduced to a synonym of *C. sinensis*, in Fl. Mont. Formos. p. 92. Having examined the type of *C. sinensis* Hemsl. at Kew, I have, however, found that my plant does not quite agree with Hemsley's species. *C. formosana* differs from *C. sinensis* mainly in having narrower leaves with shallower dentation, and much larger petaloid sepals. The Formosan plant should, therefore, be regarded as a species distinct from the continental plant.

Hydrangea Linn.

Hydrangea angustipetala Hayata sp. nov. Frutex, scandens?, ramis deorsum subglabris fusco-rubescentibus, sursum cinereo-tomentosis. Folia opposita longe oblonga vel late lanceolata, 12 cm. longa, 3½ cm. lata, serrata, serris ascendentibus, supra hispidula, subtus villoso-tomentosa, pallidiora, petiolis 1 cm. longis. Cymæ terminales 7 cm. longæ totiusque latæ, ramis tomentellis. Flores marginales steriles, longe pedicellati, pedicellis 1½ cm. longis, sepalis 4, peta-

loideis, inæqualibus, exterioribus longioribus, obovatis 14 mm. longis, 6 mm. latis, utrinque acutis margine obscure dentatis, interioribus minoribus, 5 mm. longis, 3 mm. latis. Flores fertiles : sepalis 5, lanceolatis, 2 mm. longis tomentellis utrinque acutis ; petalis 5, sepalo longioribus, longe obovatis apice obtusis. Stamina 10, circ. 3 mm. longa, antheris late orbicularibus, utrinque retusis. Ovarium subsuperius vel semisuperius, stylis 2-3, $1\frac{1}{2}$ mm. longis.

Hab. Giran : Chūrei, leg. T. Kawakami et U. Mori, Juni. 1906, (No. 1383).

Remarkable for nearly superior ovary and very narrowed sepals of the fertile flowers. Somewhat near *Hydrangea Davidi* Franch.; but differs from it by the more densely hairy leaves, peduncles, and hairy longer sepals ; also near *H. Hemsleyana* Diels, from which this is distinguishable by the much elongated leaves.

Deutzia Thunb.

Deutzia kelungensis Hayata sp. nov. Rami graciles, cinerascentes, teretes, ut videtur scandentes, ramulis gracilibus angularibus tenuiter stelleto-pubescentibus. Folia opposita, ovato-oblonga, vel ovato-lanceolata, 8 cm. longa, 3 cm. lata, apice acuminata, acuminibus acutis vel obtusis, basi obtusa rotundata, vel acuta, margine serrulata, serrulis brevissimis breve apiculatis, supra scabra, stellato-pubescentia, costis et venis tenuissimis, subtus pallidissima, pilis stellatis densiuscule vel parce obtecta, costis et venis lateralibus prominentibus, petiolis 6 mm. longis, supra sulcatis, inter petiolos transverse striatis. Paniculæ ad apicem ramulorum terminales vel axillares, 6 cm. longæ, pauci-floratæ, pedicellis 2 mm. longis, bracteis minutis subulatis. Calyx campanulatus extus plus minus stellato-pubescens, 3 mm. longus,

lobis patentibus triangularibus, obtusis, vel acutis 1½ mm. longis, 2 mm. latis, caducissimis. Petala 5-6, duplicato-valvata erecta vel erecto-patentia, oblonga 8½ mm. longa, 4 mm. lata, apice subacuta, basi late truncata margine plicata, plus minus pubescentia, vel subglabrata. Stamina 10-12, altera longiora, altera breviora, staminibus longioribus 7 mm. longis, filamentis dilatatis 6 mm. longis 1 mm. latis, apice obtuse ob-sagittato-attenuatis. Discus annularis integer, stylis 4 distinctis, apice leviter 2-lobatis stigmatosis. Capsulæ subglobosæ 3½ mm. longæ, 4-lobatæ, septicide in coccos 4 dehiscentes. Semina numerosa, fusiformia, late leviter compressa, utrinque alis productis ½ mm. longis longitudinaliter striatis.

Hab. Kelung: Zuihō, leg. T. Kawakami, Mart. 1907, (No. 4235).

Near *D. gracilis* and *D. parviflora*; but differs from the former in having much broader hairy calyx-lobes, and more scabrous leaves, and from the latter in having nearly erect duplicately valvate petals, and a few flowered panicles, or even racemes. The petals of *D. parviflora* appear to be deeply imbricate, but those of the present plant are apparently valvate.

Deutzia taiwanensis Hayata sp. emend.

Deutzia crenata S. et Z. δ. *Taiwanensis* Maxim. Hydrang. Asia. Orient. p. 23.

Deutzia scabra Hayata in Matsum. et Hayata Enum. Pl. Formos. p. 92, (pro parte).

Frutex, ramis rubescentibus, albo-punctatis. Folia opposita, ovata vel oblonga 10 cm. longa 5 cm. lata, subintegra remote obscureque mucronato-crenata, supra pallido-viridia minute punctato-lepidota, subtus albo-lepidota pallidissima, venis primariis 6-7, prope marginem conniventibus, utrinque scaberrima apice

cuspidato-acuta vel -obtusa, ad summum obtusa, basi rotundata. Paniculæ terminales 15 cm. longæ 6 cm. latæ, pyramidales, vel racemosæ, axillares. Calyces punctati late campanulati obscure 5-sulcati, 4 mm. longi, 7 mm. in diametro, 5-lobati, lobis late triangularibus 2 mm. longis 3 mm. latis, breve acutis. Petala 5, valvata, angustata 12 mm. longa, 5 mm. lata, apice acuta, margine lamellata. Stamina 10, 2-seriata, exterioribus longioribus 12½ mm. longis, filamentis 11 mm. longis angustatis circ. 1 mm. latis apice 2-dentatis, supra dentem abrupte contractis. Antheræ orbiculares utrinque retusæ. Styli 5, 11 mm. longi, apice capitellati.

Hab. Akō : Tanashū, leg. G. Nakahara, Jan. 1907 ; Taitō : Bokusekikaku, leg. K. Miyake, Dec. 1899 ; Kachinro, Mart. 1898 ; Kōtōshō, leg. T. Kawakami et G. Nakahara, Feb. 1906, (No. 988) ; Giran : Hachirisha, leg. T. Kawakami et U. Mori, Juni. 1906, (No. 1376) ; Taitō : Suibi, leg. T. Kawakami et G. Nakahara, Jan. 1906 (No. 670).

The present plant is very near *D. scabra* Thunb. and *D. pulchra* Vidal ; but it differs from the former in having dentate stamens and in the number of styles which are usually five ; and from the latter, in having quite obtuse leaves. In Vidal's plant, the leaves are usually more acuminate, and very acute at the apex. *Deutzia crenata* S. et Z. δ. *Taiwanensis* Maxim. cited above may possibly be identical with this plant, though I have found some different points between the description of Maximowicz and that of the present one ; for the *Deutzia* credited in Formosa by Maximowicz, so far as is considered from the locality given by him, may not be otherwise than this plant as it is the only one to be found in the lowland of Formosa. Maximowicz's plant is not near *D. crenata* S. et Z., nor is it referable to a variety of that species ; but it must be a quite different one, so far as the diagnosis is concerned.

As far as I can judge from the description of the variety *δ. Taiwanensis*, it is so very different from *D. crenata* S. et Z., that it is quite proper to raise it up to specific rank. The fruit of the present plant is very similar to those of HENRY's specimen at Kew.

Crassulaceæ.

Kalanchœ ADANS.

Kalanchœ gracilis HANCE in Journ. Bot. (1870) p. 6; FORBES et HEMSL. Ind. Fl. Sin. I. p. 280; MATSUM. et HAYATA Enum. Pl. Formos. p. 134.

HAB. Takao, leg. G. NAKAHARA, Sept. 1905, (No. 577).

DISTRIB. An endemic plant.

OBSERV. A very slender herb, nearly 20 cm. high, erect; radical leaves triparted, terminal segment trilobed 2½ cm. long, 1 cm. broad, trilobulate, lobules lanceolate, obtuse at the apex, lateral segments, linear-lanceolate as long as the terminal one, divaricate nearly in right angle from the terminal one; petioles 5 mm. long; cauline leaves a very few, opposite, linear, simple or triparted, cymes terminal, rachis ternate very few-flowered, flowers yellow 2½ cm. long, 1½ cm. in diameter; sepals lanceolate 5 mm. long; petals 2½ cm. long, acute at the apex.

Haloragеæ.

Callitriche LINN.

Callitriche stagnalis SCOP.; C. B. CLARKE in HOOK. f. Fl. Brit. Ind. II. p. 435.

HAB. Tamsui, leg. T. KAWAKAMI et Y. SHIMADA, 1908, Mart.

DISTRIB. Europe, North Asia, India, Tropical Africa, Malaya, Australia and New Zealand.

Myrtaceæ.

Eugenia LINN.

Eugenia acutisepala HAYATA sp. nov. Rami graciles corticibus cinereo-pubescentibus gradatim solutis, ramulis foliatis, tetragonis, subalatis. Folia opposita elongato-oblonga, 4½ cm. longa, 1½ cm. lata, vel majora, apice obtusa basi cuneato-angustata, ad petiolum 8 mm. longum abeuntia, integra, chartaceo-coriacea, exsiccato rubescentia, supra nitida, subtus pallidiora, costis supra impressis subtus prominentibus, margine leviter revoluta integra, venis lateralibus tenuissimis rectis prope marginem attingentibus, a venulo marginali connectis, petiolis 8 mm. longis supra sulcatis. Flores cymosi, cymis ad apicem ramulorum terminalibus, vel axillaribus, 3 cm. longis ternatim ramosis, pedicellis 3 mm. longis, bracteis subulatis, bracteolis 2, oppositis, angustatis 1 mm. longis basi calycis instructis. Calyx elongato-obconicus, 4 mm. longus 3 mm. latus, basi cum pedicellis articulatus, punctatus, basi attenuatus, lobis 4, minutis triangularibus, acutis ¾ mm. longis, 1 mm. latis. Petala 4 rotundata 2 mm. longa, in calyptram plus minus connata, caduca. Stamina 20-25, filamentis teretibus 3 mm. longis, antheris cordatis ¼ mm. longis. Styli simplices, 4 mm. longi, apice truncati, stigmatosi. Ovarium 2-loculare.

HAB. Formosa.

This differs from *E. sinensis* HEMSL. in having acute calyx-lobes, and in many other points.

Eugenia formosana HAYATA sp. nov. Rami graciles, glabri, cinerascentes, ramulis oppositis. Folia opposita petiolata, oblonga vel obovata 6 cm. longa, 27 mm. lata, apice abrupte acuminata vel acuta ad summum obtusa, basi gradatim attenuata, coriacea, glabra, supra nitida, subtus pallidiora, petiolis 12 mm. longis. Flores cymoso-paniculati, paniculis terminalibus vel axillaribus 5 cm. longis 3 cm. latis, ramis furcatim vel ternatim ramosis, bracteis bracteolisque minutis, floribus breve pedicellatis. Calycis tubus 1 mm. longus, limbus campanulatus $1\frac{1}{2}$ mm. longus, 3 mm. in diametro truncatus, lobis obsoletis. Petala valde imbricata orbicularia 2 mm. in diametro, in calyptram plus minus connata, decidua. Stamina ∞, multi-seriata, longiora 5 mm. longa, filamentis liberis patentibus. Ovarium tubo calycis connatum, stylo $3\frac{1}{2}$ mm. longo.

HAB. Kōshūn: Kurarusha, leg. T. KAWAKAMI, Juli. 1906, (No. 1649).

Near *Eugenia cymosa* LAM.; but differs from it by the obovate, but not caudate, leaves. The leaves of *E. cymosa* are generally oblong.

Eugenia kashotœnsis HAYATA sp. nov. Rami congesti, cortice rubro-cinereo vestiti. Folia opposita breve petiolata, oblonga vel oblanceolata, $3\frac{1}{2}$ cm. longa, $2\frac{1}{2}$ cm. lata, apice rotundata basi acuta vel attenuata, coriacea, petiolis 2-3 mm. longis. Cymæ terminales 4 cm. longæ totiusque latæ, ramis brevibus oppositis congestis, approximatis, pedicellis 3 mm. longis. Calycis tubus 3 mm. longus limbus campanulatus, truncatus, (lobis obsoletis), 3 mm. longus $4\frac{1}{2}$ mm. in diametro. Petala 4, conniventia, in calyptram plus minus connata, decidua, inæqualia, orbicularia, minoribus 2 mm. longis, majoribus 3 mm. longis. Stamina ∞, multi-seriata libera, filamentis filiformibus inæqualibus, longioribus 7 mm. longis,

erecto-patentibus. Ovarium tubo calycis connatum, stylo 3 mm. longo.

HAB. Kwashōtō, leg. T. KAWAKAMI et G. NAKAHARA, Feb. 1906, (No. 1047).

Near *E. congesta* MERRILL, but differs from it in having terminal cymes and pedicelled flowers.

Melastomaceæ.

Astronia BLUME.

Astronia pulchra VIDAL, Revis. Pl. Vasc. Filip. p. 136; DC. Monogr. Phanerog. VII. p. 1097.

HAB. Hōzan ; Kōtōshi, leg. K. MIYAKE, Nov. 1899 ; Kashōtō, leg. T. KAWAKAMI et G. NAKAHARA, Feb. 1906, (No. 1043) ; Kōshūn, leg. N. KONISHI, Juli. 1903.

DISTRIB. The Philippines.

Tashirœa MATSUM.

Tashirœa okinawænsis MATSUM. in ITŌ et MATSUM. Tent. Fl. Lutch. p. 480.

HAB. Shintiku : Kareizan, leg. T. KAWAKAMI et U. MORI, Jun. 1906, (No. 1434).

DISTRIB. The Loo-choo islands.

Bredia BLUME.

Bredia scandens (ITŌ et MATSUM.) HAYATA n. n.

Bredia hirsuta var. *scandens* ITŌ et MATSUM. Tent. Fl. Lutch. p. 487 ; MATSUM. et HAYATA Enum. Pl. Formos. p. 148.

The present plant is first mentioned by Dr. T. Itō, jointly with Prof. J. Matsumura, in their Tent. Fl. Lutch. p. 487 and afterwards is corroborated by myself in Enum. Pl. Formos. p. 148. After having examining the type of *B. hirsuta* Blume. at Kew' I have found that the type is far different from the present plant, and I am very much inclined to regard it as a species distinct from Blume's. Our plant has, as metioned by Prof. J. Matsumura, "smaller stamens, shortly spurred posteriorly, a little auricled anteriorly, and anthers 1-porose, 2-auricled on the anterior side, connective not at all or very shortly produced, tuberculate on the posterior side."

Osbeckia Linn.

Osbeckia scaberrima Hayata sp. nov.

Osbeckia aspera Hayata in Matsum. et Hayata Enum. Pl. Formos. p. 146; Hayata Fl. Mont. Formos. p. 97, (non Blume).

Rami strigosi, cinerascentes recti, teretes, graciles, pilis strigosis, adpresse obtecti, ad apicem ramulorum strigoso-barbati. Folia opposita, elongato-oblonga, vel lanceolato-ovata, 4 cm. longa, 13 mm. lata, apice obtuso-acuta, basi rotundata, vel acuta, integerrima, 5-nervia, supra ad nervos glaberrima, cæterum adpresso-strigosa, pilis ad areolas inter nervos regulariter obtecta, ad areolas marginales pilis validioribus longioribus 1 mm. longis obtecta, margine adpresso-ciliata, subtus pallidissima, ad paginam parce tenuiter strigosa, ad nervos validiuscule strigosa, petiolis 4 mm. longis, strigosis. Flores cymosi, cymis 3-5-floratis, 2 cm. longis. Calycis tubus subglobosus 6 mm. longus, extus strigosus, lobis ovato-triangularibus acuminatis, 5 mm. longis, 2½ mm. latis, medio strigosis, cæterum glabris, margine strigoso-ciliatis, intus glabris,

inter lobos longe aristatus, aristis validissimis basi tumidis. Petala rotundata, margine ciliolata. Stamina circ. 15, fauce calycis inserta, 6 mm. longa, filamentibus crassiusculis complanatis 3½ mm. longis, antheris linearibus 2¼ mm. longis, ½ mm. latis, apice 1-porosis, connectivis basi productis cum filamentis articulatis. Ovarium semi-inferius. 5-loculare, apice hirsutum, stylo simplici 6 mm. longo, apice truncato, stigmatoso.

HAB. in monte Morrison, leg. T. KAWAKAMI et U. MORI, Nov. 1905, (No. 1923).

Near *O. aspera* BLUME, but differs from it in having nearly spherical shorter capsules and much more scabrous leaves.

Barthea HOOK. f.

Barthea formosana HAYATA in Fl. Mont. Formos. p. 97.

This is very near *B. chinensis* BENTH. of Hongkong. I have examined the type of the Hongkong plant in the Herbarium of the island and have also compared my plant with the same species at Kew, and found that my plant is distinct from its congener, *B. chinensis*. The leaves of the Formosan plant is much thinner or even membranaceous while those of the Hongkong one are much thicker or even coriaceous.

Lythrarieæ.

Lagerstrœmia Fauriei KŒHNE in ENGL. Bot. Jahrb. XLI. p. 102.

HAB. Loo-choo.

Lagerstrœmia unguiculosa KŒHNE in ENGL. Bot. Jahrb. XLI. p. 103.

HAB. Formosa : Biyōritsu (FAURIE).

Cucurbitaceæ.

Trichosanthes Linn.

Trichosanthes cucumeroides Maxim. ; Matsum. et Hayata Enum. Pl. Formos. p. 157.

Hab. Kinpōri, leg. G. Nakahara, Juli. 1905.

Distrib. Japan.

Observ. Scandens, caulibus striatis pubescentibus, pilis strigosis patentibus, internodiis 7 cm. longis, cirrhis simplicibus. Folia alterna petiolata, oblongo-cordata, 9 cm. longa, 6 cm. lata, apice acuta vel acuminata, basi profunde cordata, margine remote obscureque serrata, serris mucronatis, 5-nervia, nervis lateralibus reflexis, venis secondariis ad apicem serrarum attingentibus, supra hispidula scabra, subtus villoso-pubescentia, ad nervos hispidula, petiolis 2 cm. longis. Fl. ♀ : racemosi, racemis axillaribus 10 cm. longis, bracteis minutis ; flores tubiformes 8 cm. longi. Calyces longe tubuliformes apice campanulati, tubis 7 cm. longis 5-dentatis, dentibus minutis lanceolatis 3 mm. longis, corollæ 5-partitæ, 1 cm. longæ.

Trichosanthes laceribractea Hayata sp. nov. Scandens subglabra striata sulcata, internodiis 12 cm. longa, cirrhis oppositifoliis 2-fidis. Folia alterna petiolata, late cordata, 15 cm. longa totiusque lata, apice acuta, basi profunde lateque cordata tenuiter 3-5-lobata, (lobo terminali triangulari, 6 cm. longo, totiusque lato), margine obscure remoteque mucronato-serrata, 5-nervia, nervis 3 centralibus erectis, 2 basilaribus reflexis, nervis omnibus ad apicem loborum attingentibus, pagine supra in exsiccato nigricantia albo-punctata scaberrima, subtus breve hispidula, petiolis 4 cm. longis. Racemi axillares secus apicem florigeri, floribus bracteatis, bracteis magnis

alabastrum amplectantibus, late ovatis acutis, margine laceratis vel fimbriatis multinerviis 3 cm. longis totiusque latis. Flores ♂ breve pedicellati ; calyces tubuliformes apice campanulati, tubis 3 cm. longi, apice 1 cm. in diametro, limbis 5-lobatis, lobis laceratis 13 mm. longis, 5 mm. latis. Corollæ non satis notæ.

Hab. Taitō : Hinan, leg. T. Kawakami et Z. Kobayashi, Juli. 1906, (No. 1589).

Near *T. Lepiniana* Cogn. ; but distinguishable by the bifid tendrils ; from *T. bracteata* Cogn. by the bifid tendrils and much lacerate bracts. Very like, or perhaps quite identical with, a Chinese specimen at Kew which is named *Trichosanthes palmata* Roxb. The type of the same species is quite different from the Chinese specimen and also from the present plant. The bracts of the type are usually entire or but a little fimbriate in the upper ones, while those of my plant are very deeply fimbriate.

Trichosanthes quinquangulata Gray ; Cogn. Cucurbit. in DC. Monogr. Phanerog. III. p. 378 ; Merrill, in Philip. Journ. Sci. III. Suppl. pp. 84 et 439.

Hab. Kōtōshō, leg. T. Kawakami et G. Nakahara, Mart. 1906 (No. 1065).

Distrib. Mangsi island ; the Philippines.

Observ. A strong trailing herb, nearly glabrous, internodes 12 cm. long, tendrils 4-divided at the apex ; leaves broadly cordate 10 cm. long as broad, cordate at the base, acute at the apex, margin 5-angled, acuminate at the tips of the angles, obscurely very minutely and remotely serrate, or nearly entire ; racemes of male flowers, 20 cm. long, bearing flowers nearly at the apex of the axis, bracts conspicuous, very large nearly entire, 3 cm. long, embracing the flower-buds.

Thladiantha Bunge.

Thladiantha punctata Hayata sp. nov. Scandens, caulibus glabris striatis, internodiis 8 cm. longis. Folia alterna petiolata, oblongo-cordata, vel ovata, 12 cm. longa, 7½ cm. lata, basi cordato-reniformia, infra basin 2½ cm. longa, sinibus ovatis acutis, margine remote mucronato-serrata, supra albo-punctata, scaberrima, subtus ad costas hispidula cæterum glabra, trinervia, nervis lateralibus nervo terminali angulo 90° divaricatis subito reflexis, venas secundarias 4-5 emittentibus, nervo terminali recto venis secundariis utrinque latere 3-4, prope marginem anastomosantibus, venulis reticulatis, cirrhis solitariis oppositifoliis simplicibus, petiolis 4 cm. longis. Flores diœcii; fl. ♂: solitarii oppositifolii, longe pedunculati, pedunculis 4 cm. longis; calyces campanulati 5-dentati, tubis 3 mm. longis, 8 mm. in diametro, dentibus lanceolatis 5 mm. longis, 1 mm. latis; corollæ 5-partitæ, segmentis late lanceolatis 17 mm. longis 5 mm. latis; stamina 5, 4 mm. longa; rudimentum ovarii convexum. Bractea 0.

Hab. Shintiku: Goshizan, leg. T. Kawakami, Dec. 1905, (No. 1303).

Thladiantha taiwaniana Hayata sp. nov. Scandens, caulibus striatis, subglabris, internodiis 7 cm. longis, cirrhis oppositifoliis simplicibus. Folia alterna, petiolata, oblongo-cordata in circumscriptione, 10 cm. longa, 8 cm. lata, apice acuta basi profunde cordata, irregulariter dentata vel obscure tenuiterque trilobata, lobo terminali oblongo 6 cm. longo, 3½ cm. lato, obscure remoteque mucronato-repandato, lobis lateralibus irregulariter dentatis, dentibus apice rotundatis et mucronatis, supra breve strigoso-punctata ad costas hispidas scaberrima, subtus ad nervos hispidula, cæterum

subglabra, trinervia, nervo centrali recto cum venis secundariis utrinque 5, nervis lateralibus nervo centrali angulo 60° divaricatis, subito reflexis venis secundariis utrinque 6, ad apicem dentium attingentibus, petiolis 3 cm. longis. Racemi ♂ axillares solitarii, 6-7 cm. longi, ad apicem florigeri, bracteis late obovatis alabastrum amplectantibus 7 mm. longis 5 mm. latis, pubescentibus. Calycis tubus concavus 4 mm. latus, pubescens, lobis 5, triangulari-ovatis 4 mm. longis 2½ mm. latis acuminatis. Petala 5, oblonga apice obtusa, basi truncata nervosa. Stamina 5, filamentis liberis.

Hab. Kishitō, leg. G. Nakahara, Aug. 1905, (No. 340).

Very near *T. calcarata* C. DC.; but differs from it in having broad lobes of the calyx. *T. calcarata* has usually linear narrower lobes.

Luffa Linn.

Luffa cylindrica Rœm.; Cogniaux in DC. Monogr. Phanerog. III. p. 456; Forbes et Hemsl. Ind. Fl. Sin. I. p. 315.

Hab. Kego, Hōsan, leg. G. Nakahara, 1906, Feb. (No. 836).

Distrib. Cultivated throughout the tropics.

Melothria Linn.

Melothria formosana Hayata sp. nov. Glabra scandens, striata, cirrhis simplicibus apice papilliferis. Folia alterna, petiolata sagittato-cordata, vel triangulari-cordata, 2½ cm. longa totiusque lata, basi sagittato-cordata apice acuta ad summum obtusa, margine irregulariter dentata, dentibus obtusis mucronatis, vel lobulata, supra scaberrimo-punctata, subtus ad nervum hispidula, 5-nervia, chartaceo-membranacea, ad marginem crassiuscula, petiolis scabriusculis 1 cm. longis. Racemi 2-3 florati, axillares, pedicellis 3 cm. longis.

Flores diœcii ? fl. ♀ : 11 mm. longi ; calyces campanulati, 3 mm. in diametro, breviter 5-dentati, dentibus 1 mm. longis. Corollæ 5-partitæ, segmentis ovatis obtuis 3 mm. longis 2½ mm. latis patentibus flavis. Ovarium oblongum 4 mm. longum, 3 mm. in diametro. apice rostratum, rostro 1½ mm. longo, stylo 3 mm. longo, disco annulari inserto, stigmatibus 3, capitatis, 2-lobis. Fl.♂ ignoit, Bacca globosa 1 cm. in diametro polysperma capillariter stipitata, stipite 2-3 cm. longo. Semina ovata complanata albescentia 4 mm. longa, glabra.

Hab. Banchoryō ; Rokkirisha, leg. G. Nakahara, Oct. 1905, (No. 592).

Alsomitra Rœm.

Alsomitra integrifoliola Hayata n. n.

Alsomitra clavigera Henry List of Pl. Formos. p. 46 ; Matsum. et Hayata Enum. Pl. Formos. p. 164, (non Hook. f.)

Gynostemma integrifoliola Cogniaux in DC. Monogr. Phanerog. III. p. 916.

The present plant is mentioned in Henry's List of Plants from Formosa p. 46, as *Alsomitra clavigera* Hook. f. and is also referred to the same species by myself in Enum. Pl. Formos. p. 164, as the description of Hooker's plant is, in greater part, in accord with my plant. Mr. E. D. Merrill of the Bureau of Science, P. I., when we were together looking over the Formosan collections in the Herbarium at Tōkyō, told me that he thought the plant to be identical with *Gynostemma integrifoliola* Cogn. To what species the present plant should be definitely referred was a very difficult question for me, until I saw the types of Hooker's and Cogniaux's species and Henry's specimen, all preserved here in the Kew Herbarium. A comparison of my plant with the specimens above

mentioned shows me clearly that it is exactly the same as the specimen in HENRY's collection, (which lacks flowers), but quite different from HOOKER's plant. I have also found that my flowering specimen accords very well with *Gynostemma integrifoliola* COGN., the specimen of which lacks fruit. In the original description of COGNIAUX, there is mentioned "fructus fuscus glaber vel leviter puberulus, 7-8 mill., crassus." The description must, I infer, have drawn up from a prœmature fruit, as there is given no account about seeds. The fruit of this species are, as is seen in my specimen, as long as 4 cm. and has numerous winged seeds. The *Gynostemma* of COGNIAUX, as far as my collections with flowers and fruit are concerned, does not accord with the general characters of *Gynostemma*, but quite agrees with those of *Alsomitra*. My plant and also COGNIAUX's plant, therefore, should be referred to the latter genus. Accordingly, the new combination, *A. integrifoliola* HAYATA is much to be desired for the present plant. It comes very near to *A. clavigera* HOOK. f., but differs from it in having much smaller pod which is only half the size of those of the latter plant, and also in having much smaller seeds with thin wings, which are bluntly and obscurely indented on the margin. The seeds of HOOKER's plant are much larger and have acutely, clearly and grossly indented wings.

Begoniaceæ.

Begonia LINN.

Begonia aptera HAYATA sp. nov. Caulis validiusculus 40-50 cm. altus, ramosus, glaber, ramis divaricatis. Folia longe petiolata oblique oblonga 14 cm. longa, 6 cm. lata, apice obtusa, basi valde oblique latere superiore acuta vel truncata, latere inferiore cordata,

vel auriculata, auriculis 2 cm. longis, totiusque latis, remote minute mucronateque serrata, inter mucrones 12 mm. longa, 6-7-nervia, utrinque glabra, supra nitida subtus pallidiora, petiolis 4 cm. longis, stipulis lanceolatis 7 mm. longis. Fructus capsularis depresso-globosus, 12 mm. longus, 14 mm. latus, apice depressus, tri-lobatus, 3-locularis, alis obscuris vel 0.

Hab. Randaizan, leg. U. Mori, Aug. 1908, (No. 7121); Shintiku: Goshizan, leg. T. Kawakami, Dec. 1905, (No. 1296).

Near *B. Wageneriana* Hook. f. Bot. Mag. t. 4988, from which the present plant differs in having very small wings of the fruit. This resembles *B. microptera* Bot. Mag. t. 4974, in respect of the small wing of the capsule, but differs from that in having the entire sepals and obscurely and remotely serrate leaves. This is also near *B. Roxburgi* A. DC. and *B. inflata* C. B. Clarke, but differs from both in having not horned, but quite rounded, fruit.

Begonia ferruginea Hayata sp. nov. Ferruginea, ramosa, exsiccato ferrugineo-rubescens primum lanata demum subglabra 30 cm. alta. Folia petiolata, stipulata oblique cordata, 15 cm. longa, 23 cm. lata, basi valde obliqua, cordata multilobata, vel irregulariter dentato-lobulata, lobulis serrulatis acutis, supra ferrugineo-hispidula, subtus ferrugineo-tomentosa, demum utraque glabrata, 7-9-nervia, petiolis 8 cm. longis, stipulis ovatis 1-2 cm. longis, 7 mm. latis. Cymæ axillares paucifloratæ bracteatæ, bracteis stipula conformibus. Fl. ♂: perianthii segmenta 4, 2-exteriora majora late ovata 2 cm. longa, 18 mm. lata, apice rotundata, basi cordata, 2-interiora minora obovata 1½ cm. longa 8 mm. lata, apice rotundata, basi obtusa. Stamina ∞, 4 mm. longa, filamentis liberis 3 mm. longis, antheris oblongis 1 mm. longis, connectivis leviter productis.

Hab. Randaizan, leg. U. Mori et B. Hayata, Aug. 1908, (No. 7128) ; Tappansha, leg. S. Nagasawa, Oct. 1905, (No. 579).

Near *B. Bowringiana* Champ. ; but differs from it in having elongate stipules and in the connectives of anthers which are obtusely acute, but not truncate as is the case with *B. Bowringiana* Champ.

Begonia kotœnsis Hayata sp. nov. Rhizoma repens foliatum, radicans. Folia longe petiolata, stipulata, orbiculata, 8 cm. in diametro, obliqua horizontaliter patentia, apice oblique et abrupte acuta ad summum obtusa, basi profunde cordata latere interiore imbricata, margine crenulata, crenis breve mucronatis, glaberrima, palmatim 10-nervia, herbacea, petiolis incrassatis, 10-20 cm. longis, stipulis triangulari-ovatis 8 mm. longis acutis basi 7 mm. latis. Scapi ad apicem rhizomatis, incrassati, 20 cm. longi, 3-florati, floribus pedicellatis, pedicellis $1\frac{1}{2}$ cm. longis. Fl. ♀ : perianthii segmenta 4, 2-exteriora majora orbicularia $1\frac{1}{2}$ cm. longa, totiusque lata, utrinque rotundata ; 2-interiora minora, obovata, 1 cm. longa, 5 mm. lata, apice rotundata. Stamina ∞, $2\frac{1}{2}$ mm. longa, filamentis liberis $1\frac{1}{2}$ mm. longis, antheris oblongis apice obtusis.

Hab. Kōtōshō, leg. T. Kawakami et G. Nakahara, Feb. 1906, (No. 1022) ; leg. K. Miyake, Nov. 1899.

Near *Begonia Bretschneideriana* Hemsl. ; but differs from it in many points.

Begonia laciniata Roxb. var. **formosana** Hayata v. n.

Begonia laciniata Hayata in Matsum. et Hayata Enum. Pl. Formos. p. 166, (non Roxb.).

Rhizoma repens, caulibus validiusculis striatis 30-40 cm. longis, glabris, pauciramosis. Folia longe petiolata, glabra oblique ovata

15 mm. longa, 7 cm. lata, basi cordata valde obliqua, apice acuminata, irregulariter dentata vel duplicato-dentata palmatim 9-11-nervia, crassiuscula, petiolis 10 cm. longis, stipulis triangulari-ovatis 6 mm. longis. Cymæ paucifloratæ. Fl. ♂ : segmenta 4, 2-exteriora majora late orbiculata, 2 cm. in diametro, 2-interiora minora obovata, apice rotundata 1½ cm. longa, 1 cm. lata. Stamina ∞ , 4 mm. longa, filamentis liberis 2 mm. longis, antheris 1½ mm. longis connectivis leviter productis apice rotundatis. Fructus capsularis 23 mm. longus, inæqualiter trigonus, inæqualiter trialatus, alis 2-anterioribus angustioribus, 4 mm. latis 23 mm. longis, 1-posteriore latiore, 20 mm. lata, 17 mm. longa. Semina minutissima.

Hab. Inter Giran et Heirinbi; inter Urai et Raga; Bokusekikaku, leg. K. Miyake, 1899 ; Shichiseitonzan et Hokuto, leg. B. Hayata, 1900, Aug.

The present *Begonia* is the most common one in Formosa. It differs from *B. laciniata* Roxb. var. *Bowringiana* in having quite glabrous leaves. The latter variety is always tomentose or pubescent. The Formosan one should, therefore, be another variety of *B. laciniata* to which Mr. W. B. Hemsley also refers in Ind. Fl. Sin. I. p. 322. It bears some resemblance to *B. sinensis* ; but differs from it in having larger flowers and glabrous leaves.

Begonia taiwaniana Hayata sp. nov. Caulis glaber, validiusculus ramosus. Folia petiolata, stipulata, glabra, lanceolata, 13 cm. longa, 3½ cm. lata, basi cordata, vel rotundata, irregulariter serrulata, latere inferiore dentata, 5-7-nervia, petiolis 4 cm. longis, stipulis subulatis 3 mm. longis. Cymæ axillares paucifloratæ, bracteis ovatis, acuminatis 5 mm. longis. Fl. ♂ : perianthii segmenta 4, 2-exteriora majora late obovata 6 mm. longa. Stamina

∞, filamentis liberis, connectivis truncatis. Fructus capsularis, 13 mm. longus, trigonus, inæqualiter trialatus, alis 2-anterioribus angustatis 2 mm. latis, 1-posteriore latiore 10 mm. lata, 13 mm. longa, septicide dehiscens.

HAB. Tappansha, leg. S. NAGASAWA, ad 3138 ped. alt., Oct. 1905, (No. 587); in monte Morrison ad 6500 ped. alt., leg. T. KAWAKAMI et U. MORI, Oct. 1906, (No. 2046).

Near *B. microptera* in Bot. Mag. t. 4974, from which the present plant differs in having one sided prominent wings.

Umbelliferæ.

Sanicula LINN.

Sanicula petagnioides HAYATA Fl. Mont. Formos. p. 103.

Near *S. orthacantha* S. MOORE; but differs from it in having much smaller flowers and stalked lobes of leaves.

Bupleurum LINN.

Bupleurum falcatum LINN.; HOOK. f. Fl. Brit. Ind. II. p. 676; FORBES et HEMSL. Ind. Fl. Sin. I. p. 327.

HAB. Biyōritsu, leg. B. HAYATA, Aug. 1908.

DISTRIB. South of Europe, Asia Minor to China and Japan.

Apium LINN.

Apium integrilobum HAYATA sp. nov. Herba, glabra, 70 cm. alta, ramosa. Folia caulina tripartita, segmentis lanceolatis 25 mm. longis basi cuneatis, petiolis 1 cm. longis. Umbellæ oppositifoliæ

sessiles, 6-7-radiatæ, 3 cm. longæ, totiusque in diametro. Umbellulæ 5 mm. longæ totiusque in diametro, 15-20 floratæ. Flores albi, pedicellis 3 mm. longis, involucri bracteis 0. Calycis dentes obsoleti. Petala ovata $\frac{2}{3}$ mm. longa, acuta in acumen inflexum producta, ad costam leviter impressam emarginata. Stylodia convexa. Fructus late ovatus a latere compressus, ad commissuram constrictus. Carpella 5-gona, juga æqualiter prominula, obtusa; carpophora apice bifida.

Hab. in humidis Maruyama, leg. Rev. U. Faurie, Mai. 1903, (No. 122).

Pimpinella Linn.

Pimpinella diversifolia DC. Prodr. IV. p. 122; Clarke in Hook. f. Fl. Brit. Ind. II. p. 688; Forbes et Hemsl. Ind. Fl. Sin. I. p. 329.

Hab. Taitō: Shinkōkō, leg. T. Kawakami et Z. Kobayashi, Juni. 1906, (No. 1508).

Distrib. Japan and China; common on the mountains of North India.

Observ. A glabrous herb, 50-70 cm. high, striate, leaves trifoliolate, long petioled, lateral leaflets nearly sessile, obliquely ovate, acuminate at the apex, round at the base, $4\frac{1}{2}$ cm. long, 3 cm. broad, terminal one ovately lanceolate 5 cm. long, 3 cm. broad, acuminate at the apex, cuneate at the base or sometimes rotundate, serrate, pubescent, petiolulate, petiolules 1 cm. long, trinerved, petioles of leaves at the basal portion of the stem very long 7 cm. long, base of the petioles dilated, embracing the stem, leaves at the upper portion are shortly petioled, petioles dilated along its length, embracing the stem. Involucral leaves linear 5 mm. long. Umbella 5 mm. long as broad; carpels ovately semiglobose $1\frac{1}{4}$ mm.

long, $\frac{2}{3}$ mm. broad, thinly 5-striate, nearly round in section.

Pimpinella Saxifraga LINN. ; DC. Prodr. IV. p. 120 ; HOOK. f. Fl. Brit. Ind. II. p. 685.

HAB. in monte Morrison, ad 8000 ped. alt., leg. T. KAWAKAMI, 1906.

DISTRIB. Europe, Northern and Western Asia.

OBSERV. A very small perennial herb ; rhizome erect, stem pubescent or subglabrous rarely branched, 15-20 cm. high ; radical leaves (including petiole) 8 cm. long, $1\frac{1}{2}$ cm. broad, pinnate, pinnæ 4-5 juged, with terminal one, or sometimes bipinnate, lateral leaflets opposite, rotundate, 1 cm. long as broad, subsessile or shortly stalked, dentate, petioles 4 cm. long ; cauline leaves $5\frac{1}{2}$ cm. long, bipinnate or bipinnatifid, leaflets 3-4-juged, oblong in outline, $1\frac{1}{2}$ cm. long 1 cm. broad, 3-5-lobed, lobes lanceolate, acute, terminal lobe usually many-cleft. Umbella 7-radiate ; umbellula small, peduncles 2 cm. long, carpels ovately semiglobose, thinly 5-ribbed $1\frac{2}{3}$ mm. long, nearly round in section. An extremely tiny form of the species.

Phellopterus BENTH.

Phellopterus littoralis BENTH. in BENTH. et HOOK. f. Gen. Pl. I. p. 905 ; FORBES et HEMSL. Ind. Fl. Sin. I. p. 331.

DISTRIB. Saghalien Japan and China.

I have seen this species in the Herbarium at Hongkong, and remember having seen the plant in Formosa. It is not yet represented from Formosa in the Herbarium at Tōkyō.

Oreomyrrhis ENDL.

Oreomyrrhis involucrata HAYATA sp. nov. Herba perennis,

cæspitosa pubescens, caulibus scapiformibus 7 cm. longis. Folia omnia radicalia pinnata vel bipinnata cum petiolis 4 cm. longa 2 cm. lata membranacea, pinnis superioribus sessilibus obovatis 8 mm. longis, 4 mm. latis basi longe cuneatis trilobatis, lobis lanceolatis, pinnis mediocribus obscure petiolulatis, pinnis inferioribus distincte petiolulatis tripartitis segmentis trilobatis, petiolulis 4 mm. longis, petiolis 2 cm. longis basi dilatatis scariosis. Scapi 6 cm. longi pubescentes. Involucri bracteæ 2-seriatæ, circ. 5 longissimæ, 5-6 breviores, bracteæ longiores lineares $2\frac{1}{2}$ cm. longæ $1\frac{1}{2}$ mm. latæ, apice trifidæ, segmentis 5 mm. longis lanceolatis divaricatis, bracteæ breviores lanceolatæ 5 mm. longæ. Umbellæ simplices, circ. 10 radiatæ, 8 mm. longæ, 10 mm. in diametro. Flores parvi, pedicellis 6 mm. longis, pubescentibus. Calycis dentes obsoleti. Petata oblonga $\frac{2}{3}$ mm. longa, acuta, apice breviter incurva, integra. Stylodia subconica. Fructus oblongo-linearis, 4 mm. longus, apice contractus, a latere leviter compressus, ad commissuram subconstrictus, exsiccato rubro-nigricans. Carpella 5-gona in sectione, juga æqualiter distincte prominula, lateralia distincta; vittæ ad valleculas solitariæ. Carpophorum bipartitum. Semina subteretia facie sulcata.

Hab. in monte Morrison, ad 12000 ped. alt., leg. T. Kawakami, et U. Mori, Oct. 1906, (No. 2249); leg. S. Nagasawa, Nov. 1905, (No. 756).

Very distinct species remarkable for its very long bracts. Somewhat near O. *andicola* Engl., but differs in having the linear involucral bracts which are very much longer than the fruiting pedicels.

Angelica Linn.

Angelica morrisonicola Hayata sp. nov. Herba validiuscula

glabra. Folia bipinnata, longe petiolata, triangularia in circumscriptione, 25 cm. longa, 30 cm. lata, petiolis 25 cm. longis, pinnis primariis petiolatis, pinnatis, petiolis 6 cm. longis, pinnulis breve petiolulatis oblongis 7 cm. longis 3 cm. latis, serratis, petiolulis 5 mm. longis, interdum trilobatis, pinnula terminali tripartita, supra glabra, subtus glauca ; petiolis foliorum inferiorum basi dilatis, superiorum vaginatis amplis oblongis, microphyllis glabris. Involucri bracteæ lineares 1½ cm. longæ. Umbellæ circ. 50 radiatæ, radicibus 4 cm. longis. Umbellulæ basi involucellatæ, 8 cm. longæ, totiusque latæ, bracteolis linearibus 3-4 mm. longis. Calycis dentes obsoleti. Petala oblonga, in acumen inflexum costam planam integra. Stylodia depressa integra. Fructus ovatus, a dorso valde compressus, commissuris latis. Carpella oblonga lenticularia, 3½ mm. lata, 5 mm. longa, apice rotundata basi cordata, jugis dorsalibus filiformibus, marginalibus in alas dilatatis. Semina a dorso compressa, facie plana.

HAB. in monte Morrison, ad 13094 ped. alt., leg. S. NAGASAWA, Nov. 1905, (No. 600), et leg. T. KAWAKAMI et U. MORI, Nov. 1906 (No. 2129).

Peucedanum LINN.

Peucedanum decursivum MAXIM. ?; FORBES et HEMSL. Ind. Fl. Sin. I. p. 335.

HAB. in littore kelung, (11-2 m. alta), leg. U. FAURIE, 1903, Juni.

This is also near *Angelica kiusiana* MAXIM. As the material is not perfect, the identification is rather conjectural.

Peucedanum graveolens BENTH. et HOOK. f.; FORBES et HEMSL. Ind. Fl. Sin. I. p. 335.

Anethum graveolens LINN.

DISTRIB. Cultivated in North China.

HAB. in ruderis Biyōritsu, leg. U. FAURIE, Mai. 1903, (No. 392).

Peucedanum terebinthaceum FISCH.; LEDEB. Fl. Ross. II. p. 314; FRANCHET. Fl. David. p. 143; FORBES et HEMSL. Ind. Fl. Sin. I. p. 335.

HAB. in monte Morrison, leg. T. KAWAKAMI et U. MORI, (Nos. 2052 et 2122); Nantō, Musha, (No. 4544); Tappansha, S. NAGASAWA, (No. 776); KAWAKAMI (No. 1744).

DISTRIB. China: Chihli, Shingking, Hupeh; Corean Archipelago; Dahuria, Mandshuria.

Peucedanum aff. **Præruptoro** DUNN.

HAB. Tōzan, leg. T. KAWAKAMI et U. MORI, Oct. 1905.

Osmorrhiza RAFIN.

Osmorrhiza longistylis DC. Prodr. IV. p. 232.

HAB. in monte Morrison, leg. T. KAWAKAMI et U. MORI, Oct. 1905.

DISTRIB. North America.

Araliaceæ.

Aralia

Aralia hypoleuca PRESL., WALP. Ann. II. p. 724.

HAB. Shintengai, leg. S. NAGASAWA, Nov. 1906, (No. 456, Fr.); Akō: Bongarisha, leg. G. NAKAHARA, Sept. 1905, (No. 503); Uraisha, leg. N. KONISHI, Dec. 1908.

DISTRIB. Philippines.

OBSERV. According to W. B. HEMSLEY (Ind. Fl. Sin. I. p. 338), the present species is the same as *A. spinosa* which is in itself very variable.

Dicotyledones.

Gamopetalæ.

Caprifoliaceæ.

Viburnum LINN.

Viburnum formosanum HAYATA (sp. emend.)

Viburnum erosum THUNB. var. *formosanum* HANCE in MAXIM. Mél. Biol. X. p. 666.

HAB. Sōzan, leg. S. NAGASAWA, 1903, (No. 101).

The present plant is quite referable to HANCE's var. *formosanum*. The variety, however, has not any stipule, while *V. erosum* has a distinct stipule, as is mentioned by MAXIMOWICZ in the literature above cited. As the Formosan plant differs from the latter species in many other points, it is quite proper to regard it as a plant specifically distinct from *V. erosum* THUNB.

Viburnum integrifolium HAYATA sp. nov. Rami ramulique graciles divaricati, cinereo-fuscentes, glabri. Folia opposita, petiolata, exstipulata, oblonga vel oblongo-lanceolata, 9 cm. longa, $2\frac{1}{2}$ cm. lata, apice abrupte acuminata, acuminibus 2 cm. longis, basi acuta, margine integerrima, venis venulisque supra inconspicuis subtus prominentibus, venis primariis ascendentibus prope marginem anastomosantibus, venulis transversis, utraque pagine glabra, supra nitida, exsiccato nigricantia, subtus pallidiora, petiolis 7 mm. longis. Cymæ ad apicem ramorum terminales, pubescentes, ramis

verticillatis. Flores 3½ mm. in diametro; calycis tubus 1 mm. longus, limbus patens 5-lobatus, lobis triangularibus, acutis ½ mm. longis. Corolla late campanulata patens 4 mm. in diametro glabra, profunde 5-lobata, lobis ovato-rotundatis 1 mm. longis apice rotundatis. Stamina 5, basin corollæ affixa, filamentis 1 mm. longis. Stylus ¾ mm. longus basi dilatatus conicus. Drupa ovoidea, carnosa 7½ mm. longa, 1-sperma. Putamen lentiforme plano-convexum, ventrale leviter concavum.

Hab. in monte Morrison, ad 7000 ped. alt., leg. T. Kawakami et U. Mori, Oct. 1906, (No. 2061); Taiko, leg. T. Kawakami et U. Mori, Aug. 1908, (Nos. 55 et 87).

Very near *V. sambucinum* Reinv.; but differs from it in having quite glabrous and much smaller leaves. Also near *V. sempervirens* C. Koch, and *V. coriaceum* Blume., but differs from the former in having narrower leaves with different venation and looser racemes, and from the latter by the smaller leaves and very much smaller flowers.

Viburnum luzonicum Rolfe in Journ. Linn. Soc. XXI. p. 310.

Viburnum erosum Hayata in Matsum. et Hayata Enum. Pl. Formos. p. 180, pro parte (non Thunb.).

Hab. Fukkishō, leg. C. Owatari, 1898; Pachina, leg. T. Niinami, Dec. 1895; Hikaku, leg. T. Makino, Nov. 1896.

Distrib. The Philippines.

The present plant was referred to *V. erosum* Thunb. by myself in my paper above cited. After comparison of this plant with the Philippine plant, I have found they are quite similar. It should, therefore, be properly referred to *V. luzonicum* Rolf. *Viburnum erosum* recorded from Formosa by Mr. W. B. Hemsley may, I infer, be the same as the Philippine plant.

Viburnum morrisonense Hayata sp. nov. Rami validiusculi,

fusco-cinerascentes, plus minus rugulosi, ramulis oppositis, furcatis, falcatim recurvis, cicatricibus annularibus foliorum notatis, glabratis. Alabastrum foliorum late glabosum, perulis paucis majusculis ovatis acutis glabratis. Folia ad apicem ramulorum 2, opposita chartacea acuminato-ovata, 5-6 cm. longa, 3½ cm. lata, apice acuta, vel acuminata, basi rotundato-obtusa, vel rotundata, margine leviter crenato-serrata, prope basin subintegra, serris latissimis, brevissimis, apice mucronatis, pinninervia, venis lateralibus subrectis, ad apicem serrarum attingentibus, venulis transversim inter venas reticulatis, costis et venis supra tenuissime impressis, subtus leviter prominentibus, utraque pagine subglabrata, subtus ad costas et venas tenuiter pubescentia et ad ramificationem venarum breve barbata, subtus pallidiora, petiolis 2½ cm. longis patentibus. Drupæ ad apicem ramulorum 5-6-fasciculatæ, longe pedunculatæ, subglobosæ, 8 mm. longæ. Putamen oblongum 6 mm. longum, valde complanatum, a dorso longitudinaliter elevatum, a facie medio late sulcatum.

HAB. in monte Morrison, leg. T. KAWAKAMI et U. MORI, Nov. 1905, (No. 2115).

Near *V. betulifolium* BATAL.; but differs from it in having much larger putamen, and also in the leaves rounded at the base. Also near *V. dilatatum* and *V. Wrightii* MIQ.; but differs from the former in having quite or nearly glabrous leaves, a very few flowered cymes, and quite glabrous peduncles, and from the latter in having not caudate smaller leaves and less flowered-peduncles. The leaves of *V. dilatatum* is densely hairy beneath, while those of the present plant are quite glabrous beneath, except the midrib and veins.

Viburnum parvifolium HAYATA sp. nov. Rami et ramuli graciles, cinereo-fuscentes, ramulis divaricatis, ramosis, pilis

ramosis dense obtectis. Folia opposita, exstipulata, petiolata, obovata vel ovata, 28 mm. longa, 15 mm. lata, apice acuta, basi cuneata obscure trilobata vel elobata, margine dentata, utrinque pagine pilis ramosis hispida, subtus pallidiora, nervis supra leviter impressis, subtus prominulis, venis primariis ascendentibus ad apicem dentium attingentibus, venulis reticulatis, petiolis hispidis 5 mm. longis. Flores in cymas terminales paniculati. Drupa carnosa, globosa 6 mm. in diametro 1-sperma. Putamen ovatum 6½ mm. longum 4 mm. latum apice acutum basi emarginatum complanatum dorso obtuse prominenteque 1-costatum, ventrale sulcatum.

Hab. in monte Morrison, leg. T. Kawakami et U. Mori, Nov. 1906, (No. 2116).

Remarkable for the small size of the leaves.

Viburnum rectangulare Græbn. in Engl. Bot. Jahrb. XXIX. p. 588.

Hab. in monte Morrison, ad 10000 ped. alt., leg. T. Kawakami et U. Mori, Oct. 1906, (No. 1808); Arizan, leg. G. Nakahara Nov. 1906.

Distrib. South Central China.

The present plant has rather smaller leaves which are ovate, 4 cm. long, 17 mm. broad, acute at both ends, remotely mucronato-serrate, or entire.

Viburnum Sandankwa Hassk.; in Bot. Mag. t. 6172 ; Maxim. in Mél. Biol. X. p. 649 ; Miq. in Ann. Mus. Bot. Lugd. Bat. II. p. 268 ; Forbes et Hemsl. Ind. Fl. Sin. I. p. 355.

Hab. Ōshima ; Naze, (T. Uchiyama) 1900 Dec.; Yæyama, leg. G. Nakahara, 1907, Aprili.

DISTRIB. Kiangsu ; Loo-choo islands.

Viburnum taitœnse HAYATA sp. nov. Ramuli graciles, purpureo-rubescentes, longitudinaliter rugulosi, fusco-tomentosi, lenticellis rubescentibus elevatis notati, teretes, remote foliati. Folia opposita, oblongo-lanceolata, vel oblongo-elliptica, 9 cm. longa, 3 cm. lata, apice acuminata, basi acuta, margine serrulata, serrulis rotundato-mucronatis, pinninervia, venis lateralibus primariis 5-6, arcuatis, costis et venis supra impressis, venulis tenuiter reticulato-impressis, subtus costis et venis prominentibus, venulis tenuissimis chartaceo-coriacea, utrinque glaberrima subtus pallidiora, petiolis $1\frac{1}{2}$ cm. longis supra late sulcatis, rubescentibus. Flores corymbosi, corymbis terminalibus 3 cm. longis, totiusque latis, ramosis fulvo-tomentosis, pilis densis brevissimisque, bracteis angustis acutis 2-3 mm. longis, pedicellis brevibus cum calycibus articulatis, floribus ad apicem pedicellorum solitariis vel geminis, bracteolis 2-3-congestis, basin calycis amplectantibus, elongato-angularibus acutis 1-2 mm. longis ciliolatis. Flores circ. 1 cm. longi, tubulosi. Calyx tubuloso-campanulatus, extus pubescens, tubo 2 mm. longo, limbo campanulato, intus glabro, leviter 5-lobato, lobis brevibus, obtuso-triangularibus $\frac{2}{3}$ mm. longis obtusis, margine ciliolatis. Corolla tubuliformis, superne leviter ampliata, 9 mm. longa, tubo 5 mm. longo, limbo 5-lobato, lobis breve rotundatis, 2 mm. longis. Stamina 5, ad faucem corollæ affixa, filamentis brevibus 1 mm. longis, antheris oblongis, 1 mm. longis. Ovarium inferius 1-loculare, stylo simplici, incrassato, circ. 2 mm. longo, basi gradatim leviter dilatato, apice 3-lobato.

HAB. Taitō : Daishinzan, leg. T. KAWAKAMI et U. MORI, Jan. 1908, (No. 4546).

Near *Viburnum erubescens* WALL., but differs from it in having

denser and shorter cymes, narrower leaves, and calyx densely covered with stellate hairs. *V. erubescens* has a nearly glabrous calyx, much broader leaves, and more elongated cymes.

Viburnum taiwanianum HAYATA sp. nov. Rami cineraceo-fuscentes, apice pilis stellatis brevissimis obtecti. Folia decidua, opposita, secus apicem ramorum approximate disposita, petiolata, exstipulata, ovato-oblonga vel ovato-lanceolata, 15 cm. longa, 5½ cm. lata, apice acuminata, acuminibus 2-3 cm. longis, basi rotundatis supra glabra in exsiccato nigricantia, subtus pallidiora, pilis stellatis brevissimis pubescentia, margine minute denticulata, vel subintegra, venis primariis ascendentibus, venis secundariis transversis, petiolis 2 cm. longis. Cymæ ad apicem ramorum terminales, pedunculis 4 cm. longis, ramis verticillatis, bracteis linearibus 4 mm. longis. bracteolis subulatis. Calycis tubus cylindricus 2 mm. longus, limbus breve campanulatus 1 mm. longus 2-lobatus, lobis triangularibus obtusis ½ mm. latis. Corolla tubuliformis 3½ mm. longa basi leviter contracta apice 5-lobata, lobis rotundato-triangularibus apice rotundatis ¾ mm. latis vel latioribus, glabris. Stamina 5, basi corollæ affixa, 5½ mm. longa, filamentis liberis. Stylus crassiusculus conicus, 1 mm. longus.

HAB. in monte Morrison, ad 6000 ped. alt., leg. T. KAWAKAMI et U. MORI, Oct. 1906, (No. 1720); Tōzan, in montibus Morrison leg. G. NAKAHARA, Oct. 1906; Nantō: Shojōdaizan, leg. T. KAWAKAMI et U. MORI, (No. 1119); Taitō: Basshishō, leg. N. KONISHI, Juli. 1902, (No. 31); Randaizan, leg. U. MORI, (No. 7033).

Near *Viburnum urceolatum* SIEB. et ZUCC., but differs from it in having very obscurely toothed, or even entire, more acuminate leaves, and in their venation.

Abelia R. Br.

Abelia chinensis R. Br., DC. Prodr. IV. p. 339 ; Maxim. in Mél. Biol. XII. p. 475 ; Forbes et Hemsl. Ind. Fl. Sin. I. p. 358.

Hab. Taitō : Saidosan, leg. T. Kawakami et U. Mori, 1908, Jan. (No. 4511).

As the specimen is imperfect, the determination is not satisfactory. This is also near *A. Achersoniana* Græbn.

Lonicera Linn.

Lonicera affinis Hook. et Arn. var. **angustifolia** Hayata n. n. Suffruticosa, ramis gracilibus grabris, cortice rubro-cinereo demum gradatim soluto, internodiis 5 cm. longis. Folia opposita petiolata, lanceolata, 7½ cm. longa, 23 mm. lata, apice gradatim acuminata, basi rotundata, margine integra, vel minute denticulata, ciliolata, coriaceo-membranacea, supra venulis impressis, reticulatis, venis primariis prope marginem anastomosantibus, petiolis 1 cm. longis, ciliolatis. Flores in cymas dispositi, cymis terminalibus vel axillaribus pauciforatis, pedunculatis, floribus ad apicem pedunculi geminis, vel solitariis, pedunculis 1½ cm. longis. Flores basi 1-bracteati, et 2-bracteolati, bracteis linearibus 4 mm. longis, bracteolis late ovatis rotundatis ciliolatis 1 mm. longis. Calyces urceolati 4 mm. longi, limbis campanulatis 5-lobatis, lobis ovatis acutis obscure glanduloso-serratis. Corolla non visa. Bacca globosa 7 mm. in diametro.

Hab. in monte Morrison, ad 6000 ped. alt., leg. T. Kawakami et U. Mori, Oct. 1906, (Nos. 1816 et 1946) ; Ganzan, in montibus Morrison, ad 9141 ped. alt., leg. S. Nagasawa, Oct. 1905, (No, 644) ; Arizan, in montibus Morrison, leg. G. Nakahara, Oct. 1906.

Differs from the type in having much narrower leaves, and lanceolate lobes of the calyx.

Rubiaceæ.

Nauclea Linn.

Nauclea taiwaniana Hayata sp. nov. Rami glabri, validiusculi, fusco-rubescentes, lenticellis pauce obtecti. Folia opposita, petiolata, ovata, 10 cm. longa, 5 cm. lata, apice acuminata vel abrupte acuta basi rotundata truncata vel leviter cordata subintegra vel obscure repanda, venis primariis utrinque latere 7, intermediis ad costas angulo 40° egressis, basilaribus circ. angulo 90° egressis, supra nitida subtus pallidiora, petiolis 3½ cm. longis. Flores capitulati, capitulis globosis axillaribus, solitariis longe pedunculatis, pedunculis 2½ cm. longis. Fructus 2-coccus, coccis angustis clavatis, 5½ mm. longis, 2 mm. latis, bracteis persistentibus 5 mm. longis complanatis apice peltatis, peltis angularibus, pubescentibus. Semina linearia, testa alata, 3½ mm. longa, ⅔ mm. lata, apice 2-lobata.

Hab. Kōshūn : Kōkō, leg. T. Kawakami, Juli. 1906, (No. 1654).

Nauclea transversa Hayata sp. nov. Rami validiusculi ramosi, cortice cinerascente, lenticellis dispersis. Folia opposita, longe petiolata, ovata, vel oblonga, 12 cm. longa, 5 cm. lata, utrinque pallidiora apice abrupte acuminata, basi rotundata, vel truncata, venis primariis utrinque latere 6-7, ad costas angulo 60° egressis, basilaribus circ. angulo 90° egressis, petiolis 4-5 cm. longis. Flores capitulati, capitulis axillaribus solitariis, pedunculatis, pedunculis 3-4 cm.

longis. Fructus 2-coccus, coccis clavatis 5 mm. longis, $1\frac{2}{3}$ mm. latis, apice truncatis, basi acutis, bracteis peltatis 4 mm. longis peltis 5-lobatis. Semina linearia 3 mm. longa, testa alata, apice 2-lobata.

HAB. Nanshikiaku, leg. S. NAGASAWA, ad 2663 ped. alt., Nov. 1905, (No. 601).

Near *N. taiwaniana* HAYATA ; but distinguishable in the longer leaves, in the paucity of the primary veins, which are inserted in a more obtuse angle, and in the unpolished surface of the leaves.

Nauclea truncata HAYATA sp. nov. Rami cinerascentes, lenticellis transversis dispersi. Folia opposita, subsessilia, oblonga 16 cm. longa, 8 cm. lata utrinque obtusa vel basi truncata, glabra exsiccato pallidiora, integerrima, supra venis primariis impressis, subtus prominente elevatis, ad costas angulo 25° egressis, venulis inconspicuis late reticulatis, stipulis oblongis utrinque rotundatis, 14 mm. longis, 8 mm. latis, deciduis. Flores capitulati, capitulis terminalibus, globosis, subsessilibus 2 cm. in diametro.

HAB. Kōshūn, Kōkō ; leg. T. KAWAKAMI, Juli. 1906, (No. 1660).

Near *N. sessilifolia* ROXB. and *N. reticulata* HAV., but differs from both by the obovate and shortly acute leaves.

Uncaria SCHREB.

Uncaria Kawakamii HAYATA sp. nov. Frutex scandens, ramis fusco-rubescentibus, tereto-tetragonis, parcissime hirsutis, ramulis gracilibus tetragonis, parce ferrugineo-pubescentibus vel subglabratis, remote foliatis, internodiis 7 cm. longis. Folia opposita, chartacea, elliptico-ovata, vel oblonga, 6-12 cm. longa, 3-5 cm. lata, apice abrupte acuminata, acuminibus obtusis basi truncato-rotun-

data, vel truncato-acuta, margine subintegra, venis lateralibus primariis utraque latere circ. 7, tenuibus, ad costas utrinque parcissime hirsuta, cæterum glabrata, subtus pallidissima, petiolis 1 cm. longis, hirsutis, stipulis interpetiolaribus triangulari-ovatis, 1 cm. longis, apice 2-lobatis, lobis acuminatis, glabris, margine hirsutis. Capitula florum axillaria, solitaria, longe pedunculata, pedunculis (pedunculis sterilibus) hirsutis 2 cm. longis, apice cum pedicello articulatis, apice 4-bracteatis, bracteis verticillatis, 2-alteris latioribus, 2-fidis reflexis, 12 mm. longis, 7 mm. latis, lobis ovato-lanceolatis, acuminatis, 10 mm. longis, 3½ mm. latis, margine ciliolatis, basi barbatis, 2-alteris angustioribus lineaibus, 13 mm. longis, 1½ mm. latis, simplicibus margine parcissime ciliolatis, basi barbatis, pedicellis (pedunculis floriferis) 1-1½ cm. longis, dense adpresse hirsutis. Capitulum globosum sine corolla 1½ cm. longum, calycis tubus longe fusiformi-urceolatus, 4½ mm. longus, pubescens, limbo campanulato, 2½ cm. longo, profunde 5-lobato, lobis angustis, lanceolatis, obtusis, extus et margine pubescentibus, intus glabris. Corollæ tubus filiformis, 1 cm. longus, sursum plus minus dilatatus, limbo campanulato, 2 mm. longo, profunde 5-lobato, lobis oblongo-ovatis vel spathulato-oblongis, crassiusculis, 1½ mm. longis, ¾ mm. latis, glabris, apice rotundatis vel brevissime mucronatis, margine leviter reflexis, dorso medio carinatis, antheris fauce corollæ affixis, ovato-oblongis, 1 mm. longis, basi 2-lobatis, (lobis aristato-acutis), sessilibus, vel filamentis brevissimis. Ovarium 2-loculare.

Hab. Kōshūn leg. T. Kawakami.

The present plant is the nearest to *Uncaria philippinensis* Elmer, but differs from it in having larger heads and longer corolla-tubes. Also near *U. florida* Vid., but differs from it in having lanceolate calyx-lobes and longer peduncles of flower-heads.

Thysanospermum CHAMP.

Thysanospermum diffusum CHAMP. ; WALP. Ann. V. p. 118 ; BENTH. Fl. Hongk. p. 146 ; FORBES et HEMSL. Ind. Fl. Sin. I. p. 371 ; MATSUM. et HAYATA Enum. Pl. Formos. p. 182.

HAB. Formosa in Herb. Taihoku-Museum.

DISTRIB. Kiangsu, Hongkong, Loo-choo islands.

This species is represented in the Museum of Taihoku. It is not yet represented from the island in the Herbarium at Tōkyō.

Hedyotis LINN.

Hedyotis nantœnsis HAYATA sp. nov. Herba basi suffrutescens, ut videtur scandens, vel volubilis, viridissimi, ramis angulatis, plus minus scabriusculis vel lævibus, internodiis 6-7 cm. longis. Folia oblonga, oblongo-lanceolata, mutabilia in magnitudine, 5-10 cm. longa, 2-3½ cm. lata, apice acuta, vel acuminata, basi acuta, subito attenuata ad petiolum abeuntia, integra, chartaceo-membranacea, pinninervia, venis lateralibus 5-6, basilaribus cum marginibus parallelis, cæterum ascendentibus angulo acuto divergentibus, sursum recurvatis, supra impressis subtus tenuiter prominentibus, supra viridissima subtus pallidiora, utraque pagine glabra, sed plus minus scabriuscula, petiolis 5 mm. longis, stipulis interpetiolaribus membranaceis, aristato-4-dentatis, sinibus inter dentes truncatis. Flores paniculato-cymosi, cymis terminalibus, vel axillaribus, ramosis, floribus ad apicem ramulorum umbellatim 10-30 fasciculatis, bracteis lanceolatis, pedicellis 2 mm. longis. Calycis tubus campanulatus, 1½ mm. longus, lobis 4, linearibus 2 mm. longis ½ mm. latis, recurvis, sinibus inter lobos trun-

catis latis appendiculatis, appendiculis setiformibus ½ mm. longis. Corolla campanulato-tubuliformis, tubo 1½ mm. longo, utraque glabro, limbo 4-lobato, lobis angustatis 5½ mm. longis 1 mm. latis, a medio revolutis apice obtusis, 3-nerviis, extus glabris, intus deorsum barbatis, sursum glabris. Stamina 4, filamentis exsertis, 7 mm. longis filiformibus basi intus barbatis, antheris ovato-linearibus, 2 mm. longis, basi profunde 2-lobatis. Ovarium inferius, apice setulis erectis albis dense fasciculatis coronatum, 2-loculare, ovulis numerosis, stylo 5 mm. longo, a medio albo-barbato, apice profunde 2-lobato, lobis linearibus complanatis, hirsutis, 2 mm. longis, patentibus, recurvis, fuscentibus.

Hab. Nantō, leg. T. Kawakami, (No. 4883); Giōchi, leg. G. Nakahara, 1905, Aug.

Near *H. capitellata* Wall. and *H. Elmeri* Merrill, but differs from the former in having stalked flowers, and from the latter in having narrower leaves, and much narrower calyx-lobes. The flowers of *H. capitellata* are nearly sessile. This appears also to be near *H. macrostemon* H. et A., which I have seen in the Herbarium at Hongkong, but so far as I can judge from the floral characters of the species given in Hook. et Arn. Bot. Beech. Voy. p. 192, they are not at all similar, but very distinct.

Mussænda Linn.

Mussænda kotœnsis Hayata sp. nov.

Mussænda macrophylla Matsum. in Tōkyō Bot. Mag. XIV. p. 147; Matsum. et Hayata Enum. Pl. Formos. p. 188, (non Wall.).

Herba suffrutescens, ramis teretibus, subangulatis, a centro medullosis, lenticellis oblongis parce dispersis, ad nodos barbatis, cæterum glabris. Folia majuscula, membranacea vel tenuiter

chartaceo-membranacea, oblonga vel obovato-oblonga, 20-24 cm. longa, 8-10 cm. lata, apice cuspidato-acuminata, basi cuneato-acuta, integra utraque ad costas et venas parce hirsuta, cæterum glabra, venis lateralibus utraque latere 9-10, venis basilaribus angulo acuto divergentibus, a margine parallelibus, mediocribus ad costas angulo 40° recto-ascendentibus, sursum arcuatis, subtus pallidissima, petiolis 5 cm. longis, stipulis interpetiolaribus latissimis, 12 mm. latis, 8 mm. longis, ad insertionem minute extus deorsum longe barbatis, intus glabris sed setosis, (setis digitiformibus numerosis), apice, 2-fidis, lobis apice divergentibus margine ciliolatis, reflexis. Cymæ terminales 10 cm. longæ, totiusque latæ, foliis floralibus 1, vel 2, majusculis, albicantibus, membranaceis, ovato-cordatis, 11 cm. longis, 7½ cm. latis, apice cuspidato-acutis, basi rotundato-cordatis, vel rotundato-acutis, ima breve attenuatis, margine ciliolatis, utraque ad costas et venas parce hirsutis, cæterum glabris, distincte 5-nerviis, nervis angulo acuto divergentibus, bracteis palmatim trilobatis, extus dense hirsutis intus parcissime hirsutis, ad insertionem dense hirsutis lobis centralibus angusto-acutis, longioribus, 8 mm. longis, 2 mm. latis, lobis lateralibus ovato-acutis brevioribus. Calyx dense hirsutus, cylindrico-obconicus, 5 mm. longus, lobis triangulari-lanceolatis, 8 mm. longis 3 mm. latis, acuminatis, extus dense hirsutis, entus parce pubescentibus. Alabastrum floris, corolla cylindrica, apice leviter dilatata acuta, 5-costata, extus dense hirsuta, pilis longis 2 mm. longis, tubo 23 mm. longo, intus densissime villoso-barbato prope basin glabro. Corollæ limbus patens 5-fidus, lobis ovatis, 5 mm. longis, cuspidato-acutis, extus hirsutis, intus glabris, exsiccato fusco-rubescentibus. Stamina prope basin tubi corollæ inserta, filamentis brevioribus 1½ mm. longis, antheris linearibus 5½ mm. longis, apice connectivis leviter productis obtusis, basi apice locelli appendiculatis, appendiculis obtusis.

Stylus brevior 3 mm. longus apice 4-5-fidus. Discus annularis.

Hab. Kōtōshō, leg. K. Miyake, Nov. 1899; leg. S. Kusano, 1909.

Near *M. macrophylla* Wall. but differs from it in having smaller bracts, much larger floral leaves, and smaller calyx-lobes.

Guettarda Linn.

Guettarda speciosa Linn.; Hook. f. Fl. Brit. Ind. III. p. 126; Wight Ic. Pl. Ind. Or. t. 40; Forbes et Hemsl. Ind. Sin. I. p. 384.

Hab. Pratas: leg. T. Kawakami, 1907.

Distrib. Common on the shores of the Tropics.

Pæderia Linn.

Pæderia tomentosa Blume form. **tenuissima.**

Hab. Randaizan, leg. B. Hayata et U. Mori, Aug. 1908.

Observ. Extremely delicate form of *P. tomentosa.*

Nertera Banks et Sol.

Nertera nigricarpa Hayata Fl. Mont. Formos. p. 115.

This is very near *N. depressa* Banks; but differs from it in having black coloured berries, and in the leaves, quite obtuse or even rounded at the apex, and slightly cordate at the base. *N. depressa* has yellow coloured fruit, and the leaves are more or less acute at the apex and much more cordate at the base.

Coprosma Forst.

Coprosma Kawakamii Hayata sp. nov. Rami validi, tetra-

goni, longitudinaliter rugulosi, cinerascentes, nigricantes, ramulis validiusculis divaricatis, fusco-nigricantibus, tenuibus tetragonis 2-3 cm. longis, 1½ mm. in sectione, pulvinis approximatis foliorum cruciatim dispositorum obtectis, pulvinis pulviniformibus ½ mm. longis ⅔ mm. latis, cum petiolo articulatis. Alabastrum foliorum pyramidale, tetragonum, perulis oblongo-triangularibus 2 mm. longis, 1⅓ mm. latis, apice acutis dorso carinatis, persistentibus. Folia opposita versus apicem ramulorum 4-6-cruciatim disposita, obovata, obspathulata, vel obovato-oblonga, crassiuscula, 1 cm. longa, 5 mm. lata, apice obtuso-acuta, vel rotundata, vel cuneato-rotundata, basi acuta, vel cuneato-acuta, utrinque glabra, supra costis venisque impressis, venulis impresso-reticulatis, subtus costis prominente venis venulisque tenuiter elevatis, rubescentibus distincte reticulatis, pagine subtus albescentia, subtus ad ramificationem venarum membranis minutis rubescentibus instructa, margine integerrima leviter reflexa, petiolis 1½-2 mm. longis intus concavis extus convexis, basi cum pulvino articulatis. Flores ad axillas foliorum superiorum longe pedunculati, pedunculis solitariis, 7 mm. longis, glabris, apice 4-bracteatis, 2-alteris majusculis angustatis 3 mm. longis 1 mm. latis, dorso carinatis, 2-alteris minoribus quadrangularibus 1 mm. longis ⅔ mm. latis apice truncatis margine longe ciliatis, floribus geminis ad apicem pedunculorum sessilibus. Calycis limbus cupuliformis irregulariter dentatus, margine parce ciliatus, disco annulari.

Hab. in monte Morrison, ad 12500 ped. alt., leg. T. Kawakami et U. Mori, 1906, Oct. (No. 2257).

Near *Coprosma myrtillifolia* Hook. f. and also *C. parviflora* Hook. f.; but differs from both in having obovate leaves and long stalked fruit.

Rubia Linn.

Rubia cordifolia Linn. var **stenophylla** Franch.

Rubia lanceolata Hayata Fl. Mont. Formos. p. 117.

I have compared my species with Franchet's variety at Kew and found that they are quite identical. The variety is very like the type.

Galium Linn.

Galium echinocarpum Hayata sp. nov. Procumbens ad nodos radicans, caulibus angularibus, glabris vel nitidis, internodiis 2 cm. longis. Folia 6-verticillata, oblanceolata, sessilia, 12 mm. longa 3½ mm. lata, apice rotundato-mucronata, mucronibus ½ mm. longis, basia attenuata, margine remote serrato-ciliolata, supra pilis paucis ascendentibus dispersa, subtus glabra. Cymæ terminales paucifloratæ, ternatim ramosæ. Flores pedicellati. Calycis tubus ovoideus ⅔ mm. longus, pilis falcatis dense obtectus, limbus obsoletus. Corolla rotata, 2 mm. in diametro, lobis 4, ovatis 1 mm. longis ⅔ mm. latis, apice obtusis. Stamina 4, corollæ lobis alterna ½ mm. longa, stylus 1 mm. longus, apice 2-fidus, stigmate capitellato. Fructus didymus orbicularis 1½ mm. in diametro, pilis 1 mm. longis rectis apice falcatis dense obtectus.

Hab. in monte Morrison, ad verticem 13094 ped. alt., leg. S. Nagasawa, Nov. 1906, (No. 755); ibidem 9000 ped. alt., leg. T. Kawakami et U. Mori, Oct. 1906, (No. 1805).

Somewhat near *G. trifidum* Michx.; but greatly differs in having much smaller leaves with ascendent hairs. Comes near *G. Aparine* Linn. from which this is distinguishable by the ascending but not retrorted, hairs.

Galium rotundifolium LINN.; DC. Prodr. IV. p. 599; HOOK. f. Fl. Brit. Ind. III. p. 204.

HAB. Randaizan, leg. B. HAYATA, Aug. 1908, (No. 7103); Arizan, in monte Morrison, ad 11000 ped. alt., leg. T. KAWAKAMI et U. MORI, Oct. 1906, (No. 1994).

DISTRIB. Europe, India, N. Africa, Western Asia.

OBSERV. Perennis procumbens, caulibus angularibus hispidulis, pilis retrorsis, internodiis 3 cm. longis. Folia 4-verticillata, sessilia oblonga vel ovata, 13 mm. longa, 6 mm. lata, apice breve acuta, basi abrupte attenuata, trinervia, margine subintegra ciliolata, utrinque pagine ad nervos pilis longioribus $\frac{1}{2}$ mm. longis divaricatim et retrorsim dispositis, cæterum pilis brevioribus pauce dispersa. Cymæ axillares paucifloratæ, ternatim ramosæ, ramis divaricatis. Flores ad apicem ramorum cymarum 5-verticillatim dispositi, pedicellati, pedicellis circ. 1 mm. longis. Calycis tubus glaber, circ. $\frac{1}{2}$ mm. in diametro, pilis falcatis dense obtectus. Corolla rotata 4-lobata, $1\frac{1}{2}$ mm. in diametro, lobis ovatis $\frac{1}{2}$ mm. longis, apice obtusis. Stamina 4, stylus $\frac{1}{2}$ mm. longus, profunde 2-fidus, stigmate capitellato. Fructus late didymus obcordatus, 1 mm. longus $1\frac{2}{3}$ mm. latus, pilis rectis divaricatis falcatis dense obtectus.

Valerianeæ.

Triplostegia WALL.

Triplostegia glandulifera WALL. "Cat. 436"; DC. Prodr. IV. p. 6; CLARKE in HOOK. f. Fl. Brit. Ind. III. p. 215; FORBES et HEMSL. Ind. Fl. Sin. I. p. 399.

Hœckia Aschersoniana ENG. et GR. in DIELS Fl. Centr. China p. 598; HAYATA in Tōkyō Bot. Mag. XX. p. 57, et Fl. Mont. Formos. p. 118.

DISTRIB. China : Hupeh, Szechuen ; North India.

[For comment as to this being referred to this genus and family, see p. 9, under Introduction].

Compositæ.

Vernonia SCHREB.

Vernonia Kawakamii HAYATA sp. nov. Herba humilis, pilosissima 10 cm. alta, basi suffrutescens, caulibus sursum foliosis, foliis approximatis, deorsum subnudis cicatricibus foliorum notatis, pilis strigosis dense obtectis. Folia alterna spiraliter disposita, spathulata, cum petiolis 33 mm. longa, 7 mm. lata, apice obtusa, basi angustata, in petiolum 17 mm. longum attenuata, utraque pagine pilosissima supra nervis impressis subtus elevatis, venis primariis utrinque latere 3, venis secundariis paucis transversis. Capitula corymbosa vel cymoso-racemosa, globosa 5 mm. longa. Involucrum late campanulatum, 4 mm. longum, 5 mm. in diametro, bracteis 4-5-seriatis, intimis longissimis, obovatis acutis margine denticulatis, exterioribus gradatim brevioribus. Receptaculum subplanum foveolatum. Corolla æqualis regularis, tubo tenui basi æquali, limbo campanulato, tubo latiori, æquilongo, anguste 5-fido. Antheræ apice appendiculatæ, basi sagittatæ, auriculis obtusis. Styli rami subulati acutiusculi hirtelli. Achænia callo basilari distincto imposita, 3-5-costata, costis valde prominentibus, apice truncata, annulis imposita, inter costas glandulosa glabra. Pappus uniseriatus, caducissimus, setis scabris subæquantibus paucis.

HAB. Kōshūn : Garanbi, leg. T. KAWAKAMI.

The present plant was provisionally named *V. maritima* by myself which name is mentioned in MATSUM. et HAYATA Enum.

Pl. Formos. p. 202. The description of the plant was not published previously. Recently another plant is described by Mr. E. D. MERRILL, under the same name as *V. maritima*. I, therefore, venture to call the present plant by another name *V. Kawakamii* the description of which I have here given. It is very near *V. maritima* of Mr. MERRILL, still it is quite distinguishable by the shape of achænium.

Lagenophora CASS.

Lagenophora Billardieri CASS.; BENTH. Fl. Hongk. p. 173; HOOK. f. Fl. Brit. Ind. III. p. 248; FORBES et HEMSL. Ind. Fl. Sin. I. p. 407; MAKINO in Tōkyō Bot. Mag. XX. p. 4.

HAB. Nantō: Randaisan, leg. U. MORI, (No. 3154).

DISTRIB. Hongkong; Loo-choo islands; Japan. Khasia mountains in Eastern India, Malay archipelago, and Australia.

Myriactis LESS.

Myriactis longipedunculata HAYATA.

Myriactis Wightii HAYATA Fl. Mont. Formos. p. 124 (non. DC.).

Herba erecta 40 cm. alta, basi foliata, flexuosa, caulibus angulatis striatis. Folia a basi caulis approximate alternatim disposita, inferiora laciniato-lobata, spathulata in ambitu, 7 cm. longa, 3 cm. lata, lobis utraque latere 2, oppositis, transversim divergentibus, rachis (partibus centralibus) linearibus, 3 mm. latis, lobo terminali orbiculari, dentato-lobulato, dentibus apice rotundato-mucronatis, sinibus inter lobum terminalem et lobos laterales superiores truncatis latioribus 6 mm. latis, lobis superioribus lateralibus obovato-cuneatis, lobulato-dentatis, (dentibus mucronatis), 13 mm. longis 1 mm. latis,

lobis infimis angustatis 1 cm. longis 5 mm. latis, acutis paucidentatis, a lobo superiore 9 mm. remotis, infra lobos infimos linearia 33 mm. longa, 3 mm. lata, basi dilatata, caulem amplectantia, (folia superiora remota, mutabilia in magnitudine, minora, lobo terminali generaliter angustiori) utrinque ad marginem costas venasque breve hirsuta, supra paucissime hirsuta, subtus pallidissima. Capitula late globosa, 7 mm. in diametro, axillaria solitaria vel terminalia, longissime pedunculata, pedunculis rectis ascendentibus 15 cm. longis, bracteis minutis 2-3 instructis. Involucrum patens, bracteis 5-6-seriatis, patento-reflexis, angustato-ovatis, 3 mm. longis, 1 mm. latis, sursum ciliolato-laciniatis, receptaculo lato convexo, infra marginem subcontracto, elevato, nudo. Corolla ♀ : liguliformis parva, tubo $\frac{1}{3}$ mm. longo, limbo $\frac{2}{3}$ mm. longo, apice obtuso, liguliformi, extus basi papilloso. Styli $\frac{1}{2}$ mm. longi, apice 2-lobati. Corolla ☿ regularis, tubo $\frac{1}{2}$ mm. longo, limbo campanulato $\frac{2}{3}$ mm. longo, 5-lobato, lobis ovatis obtusis, marginatis ; antheris oblongis, apice obtusis basi truncato-obtusis, $\frac{1}{2}$ mm. longis ; stylo 1 cm. longo, ramis $\frac{1}{3}$ mm. longis, lanceolatis. Achænia oblongo-obovoidea, $1\frac{1}{2}$ mm. longa, $\frac{2}{3}$ mm. lata, lævia, apice truncato-contracta, basi obtusa, compressa prominente 2-costata.

Hab. Tōzan, leg. G. Nakahara, Oct. 1906.

The present plant, which was erroneously referred to *M. Wightii* DC. by myself, is quite different from that species. This differs from any other species of the genus preserved at Kew. The nearest I have found at Kew is *M. Wallichii* DC.

Blumea DC.

Blumea conspicua Hayata sp. nov.

Blumea spectabilis Hayata in Matsum. et Hayata Enum. Pl.

Formos. p. 209, (non. DC.). Herba validiuscula, altissima ; caulis a centro medullosus, teres, multi-striatus, tenuiter pubescens, vel subglaber, rectus. Folia radicalia ignota, caulina oblanceolata, sessilia, 19 cm. longa, 5 cm. lata, exsiccato nigricantia, apice breve cuspidato-acuta, basi longe attenuata, margine remote serrulata, (serrulis remotis, angustatis, majusculis iis minoribus alternis, majusculis 2 mm. longis, cuspidatis, minoribus 1 mm. longis, setiformibus), supra glabra, subtus sub lente minute albo-punctata, ad costas parcissime pubescentia. Paniculæ laxifloræ, axillares vel terminales, si axillares 30 cm. longæ, pedunculis 14 longis, bracteis lanceolatis remote serrulatis, pedicellis circ. 1 cm. longis. Involucrum late patento-campanulatum basi depresso-rotundatum 8 mm. longum, bracteis circ. 5-seriatis, pubescentibus, extimis minutis acuminatis, 2 mm. longis, $\frac{2}{3}$ mm. latis, intimis linearibus 1 cm. longis, $\frac{1}{3}$ mm. latis, margine apice ciliolatis. Fl. ♀ : corolla filiformis $6\frac{1}{2}$ mm. longa, irregulariter 4-dentata, styli ramis exsertis, circ. 1 mm. longis, filiformibus. Fl. ☿ : corolla tubuloso-campanulata, $6\frac{1}{2}$ mm. longa, 5-lobata, lobis $\frac{2}{3}$ mm. longis, triangularibus obtusis, marginatis, dorso papillosis. Stamina medio tubi colloræ affixa, cum filamentis 6 mm. longa, glabra, antheris linearibus 3 mm. longis, apice appendiculatis truncatis, basi longe caudatis. Achænia cylindrico-oblonga, $1\frac{2}{3}$ mm. longa, $\frac{1}{2}$ mm. lata, multicostata, ad costas hirsuta, leviter recurvata, apice truncata, pappis coronata, basi obtusa, annulis deciduis instructa. Pappi setæ 6 mm. longæ, scabriusculæ, rubræ, persistentes.

Hab. Formosa. loco non indicato.

This differs from *B. spectabilis* DC. in having dentate leaves and larger heads.

Gnaphalium Linn.

Gnaphalium lineare Hayata Fl. Mont. Formos. p. 131, t. XIX.

Near *G. involucratum* Forst.; but differs from it in having much narrower leaves.

Gnaphalium niitakayamense Hayata Fl. Mont. Formos. p. 132.

Very near *G. nubigena*, but differs from it in having obovate leaves and shorter ovate bracts.

Carpesium Linn.

Carpesium acutum Hayata Fl. Mont. Formos. p. 133.

Near *C. triste* Maxim. from which this differs in the shape of the involucral bracts. The distinction is, however, not very clear.

Cotula Linn.

Cotula anthemoides Linn.; Benth. Fl. Hongk. p. 185; Hook. f. Fl. Brit. Ind. III. p. 316; Forbes et Hemsl. Ind. Fl. Sin. I. p. 439.

Distrib. Hongkong, Kwangtung, Szechuen, North and South Africa and India.

I have seen the species in the Herbarium at Hongkong, and remember that I saw the plant in Formosa. It is not yet represented in the Herbarium at Tōkyō.

Artemisia Linn.

Artemisia niitakayamensis Hayata Fl. Mont. Formos. p. 136, t. XX.

Very near *Artemisia arctica* LESS., but differs from it in having much thinner involucral bracts and in many other points.

Senecio LINN.

Senecio angustifolius HAYATA sp. nov. Herba validiuscula, 1-2 m. alta, caulibus teretibus glabris striatis, pauci-ramosis. Folia alterna subsessilia, lanceolata, 10 cm. longa, 1 cm. lata, apice acuminata, basi attenuata, remote serrulata, supra costis venisque impressis, subtus venis leviter costis prominente elevatis, utrinque glabra subtus pallidiora. Capitula cymosa, cymis terminalibus 10 cm. longis totiusque latis, pedicellis 1-2 cm. longis, bracteatis, bracteis linearibus 5 mm. longis. Involucrum campanulatum 6 mm. longum, bracteis 1-seriatis, lanceolatis 5½ mm. longis, 1 mm. latis margine hyalinis apice coloratis, basi additis bracteolis minutis linearibus 2 mm. longis. Fl. ♀ : ligulati, marginales ; corolla 12 mm. longa, tubo 4 mm. longo, apice extus hirsuto, limbo liguliformi 8 mm. longo, 1½ mm. lato, 6-7-nervio, patente, apice minute 3-dentato ; stylo 6 mm. longo, apice bifido, ramis complanatis truncatis recurvis. Fl. ☿ : corolla regularis tubuliformis 6 mm. longa, tubo 3 mm. longo, limbo dilatato apice 5-lobato, lobis recurvis ; styli ramis apice dilatatis penicillatis. Achænia 5-costata, pappus albus.

HAB. Randaizan, leg. T. KAWAKAMI et U. MORI, Aug. 1906, (No. 7058) ; in monte Morrison, ad 8500 ped. alt., leg. T. KAWAKAMI et U. MORI, Oct. 1906, (No. 2072) ; Ganzan, in montibus Morrison, ad 9141 ped. alt., leg. S. NAGASAWA, Oct. 1905, (Nos. 643 et 780) ; in Montibus Centralibus, ad 10000 ped. alt., leg. T. KAWAKAMI et U. MORI, Nov. 1906, (No. 2205).

Senecio intermedius Hayata (in sched.) in Matsum. et Hayata Enum. Pl. Formos. p. 208.

Herba validiuscula 60-80 cm. alta, pauce ramosa vel simplex, glabra, striata, teres. Folia caulina alterna, petiolata, orbicularia in circumscriptione, 15-30 cm. in diametro, peltata, palmatim et lacerate multifida, segmentis lanceolato-linearibus acuminatis 2-3-laceratim fidis, remote serratis, utrinque glabra, subtus pallidiora. Capitula paniculato-cymosa.

Hab. in collibus Biōritsu, leg. U. Faurie, 1903, (No. 202).

Differs from *S. Krameri* F. et Sav. in having linear lobes of the leaves and cymose inflorescence. Also near *S. aconitifolius* Turcz., but differs from it in the heads, inflorescence and leaves.

Senecio japonicus Sch. Bip. var. **scaberrimus** Hayata, (in sched.) in Matsum. et Hayata Enum. Pl. Formos. p. 208. Folia caulina longe petiolata, late cordata in circumscriptione, 11 cm. longa, 15 cm. lata, palmatim profunde 5-7-fida, segmentis lanceolatis longe laceratis, lobis lanceolatis serratis, serris acuminatis, palmatim 5-nervia, utraque pagine paleaceo-scaberrima. Flores ut typicæ.

Hab. Formosa.

Differs from the type in having much lacerate lobes of the leaves which are very scabrous on both surfaces.

Senecio morrisonensis Hayata sp. nov. Herba gracilis glabra teres, caulibus simplicibus. Folia alterna, sessilia, pinnatifida, oblongo-lanceolata in circumscriptione 13 cm. longa, 5 cm. lata, acuminata, basi attenuata, lobis remotis alternis lanceolatis 2 cm. longis, 4 mm. latis, 3-lobulatis vel tridentatis, sinibus inter lobos truncatis vel rotundatis 1 cm. longis, lobis terminalibus acuminatis

lineari-lanceolatis grosse serratis. Capitula laxe cymosa, cymis 5 cm. longis, 9 cm. latis, pedicellis 3 cm. longis, secus pedicellum 3-4 bracteatis, bracteis linearibus 5 mm. longis, $\frac{1}{2}$ mm. latis. Involucrum campanulatum, 7 mm. longum, bracteis 1-seriatis linearibus $6\frac{1}{2}$ mm. longis 1 mm. latis, margine hyalinis, basi involucri 3-4 bracteolatis, bracteolis filiformibus 4 mm. longis. Fl. ♀ marginales 5-6, liguliformes ; corolla tenuis 12 mm. longa, tubo gracili, 3 mm. longo, limbo ligulato 9 mm. longo, 1 mm. lato lineari, apice obtuso minute 3-dentato, stylo 6 mm. longo, apice 2-fido, ramis sub-teretibus, truncatis. Fl. ☿ : tubuliformes regulares 6 mm. longi, limbis 5-lobatis, lobis oblongis obtusis $1\frac{1}{2}$ mm. longis ; styli rami complanati truncati penicillati. Receptaculum leviter concavum lævе. Achænia lævia, linearia, $3\frac{1}{2}$ mm. longa, $\frac{3}{4}$ mm. lata, 5-costata, apice truncata, basi leviter contracta, pappus albus 7 mm. longus.

Hab. in monte Morrison, ad 10000 ped. alt., leg. T. Kawakami at U. Mori, Oct. 1906, (No. 2270).

Near *S. graciliflorus* DC. from which the present plant differs in being perennial and in having sessile leaves which are divided into dentate lobes ; also near *S. nikœnsis* Miq. and *S. Exul* Hance., but differs from both in having much larger heads.

Senecio taitœnsis Hayata sp. nov. Herba validiuscula, glabra, 40-50 cm. longa, caulibus pauci-foliatis. Folia radicalia, petiolata, ovata, 10 cm. longa, 7 cm. lata, apice obtusa, basi abrupte attenuata, crassiuscula, margine subintegra, vel obscure remoteque undulata, undulis breve apiculatis, utraque glabra, caulina alterna oblonga, 9 cm. longa, 3 cm. lata, apice obtusa basi breve attenuata, remote denticulata. Capitula apice caulium in dense cymas disposita. Involucrum late campanulatum, 8 mm. longum, 15 mm. in diametro, bracteis uniseriatis æqualibus lanceolatis scariosis imbri-

catis apice leviter reflexis 8 mm. longis 1½ mm. latis margine hyalinis. Receptaculum convexum planum, stipitibus plerisque brevibus instructum. Flores majusculi, ligulis plerumque 13, patentibus. Corolla fl. ♀. ligulata, tubo brevi, 1½ mm. longo, lamina lineari, 6½ mm. longa, 1½ mm. lata, apice 3-dentata, dentibus obtusis, stylo 2½ mm. longo, apice 2-fido, ramis truncatis. Fl. ☿: regulares tubulosi, limbo angusto elongato apice ampliato, 4 mm. longo, 5-lobato, lobis lanceolatis obtusis 1 mm. longis. Antheræ basi obtusæ apice appendiculatæ; styli rami complanato-teretes apice subdilatati truncati. Achænia 10-costata; pappus copiosus albus scaber.

Hab. Taitō: Taruko, leg. G. Nakahara, Jan. 1906, (No. 691).

Near *Senecio flammeus* DC. from which this differs in having much broader leaves. Also near *S. Plerotii* Miq. but differs from it by the shape of the leaves.

Senecio taiwanensis Hayata sp. nov. Herba validiuscula, 50 cm. longa, simplex, glabra. Folia alterna sessilia, lanceolata, 14 cm. longa 3 cm. lata, apice acuminata, basi attenuata, margine dentata, dentibus horizontaliter divaricatis acutis, costis supra sulcatis, subtus elevatis, utrinque glabra, subtus pallidiora. Capitula cymosa terminalia, cymis 5 mm. longis, totiusque latis pedicellis 2 cm. longis, bracteis linearibus 2 mm. longis. Involucrum campanulatum, 8 mm. longum, bracteis lineari-lanceolatis 8 mm. longis, 2 mm. latis, margine hyalinis apice obtusis coloratis, additis bracteolis linearibus. Fl. ♀: ligulati, marginales, 5-6; corollæ tubo 4 mm. longo, extus sursum hirsuto, limbo liguliformi oblongo-lineari, 13 mm. longo, 1¾ mm. lato, apice truncato emarginato breve 3-dentato, 7-nervio. Fl. ☿: corolla tubuliformis, 8 mm. longa, tubo 4 mm. longo, limbo dilatato, 4½ mm. longo, apice 5-lobato, lobis oblongis, styli ramis recurvis truncatis penicillatis. Achænia 10-costata, pappus albus, 9 mm. longus.

Hab. in monte Morrison, ad 10000 ped. alt., leg. T. Kawakami et U. Mori, Nov. 1906, (No. 2124) ; Shukorankei, in monte Morrison, ad 11157 ped. alt., Nov. 1905, (No. 616).

Somewhat near *S. nemorensis* Linn., but differs in both serration and venation of the leaves.

Senecio tozanensis Hayata sp. nov. Herba validiuscula, 1-2 m. alta, caulibus pauci-ramosis, glabris obscure striatis. Folia alterna, petiolata, lanceolata, 20 cm. longa, 5 cm. lata, apice acuminata, basi acuta, grosse dentata, dentibus horizontaliter patentibus acutis apiculatis triangularibus 4 mm. longis, sinibus truncato-obtusis, costis supra sulcatis, subtus prominentibus, petiolis 2½ cm. longis, sulcatis. Capitula laxe paniculato-cymosa, paniculis ramosis, pedicellis gracilibus 5 cm. longis, bracteolis minutis. Involucrum tubuloso-campanulatum, 8 mm. longum, bracteis 1-seriatis, linearibus, margine hyalinis apice acutis corolatis, basi additis bracteolis minutis 5, linearibus 2 mm. longis. Receptaculum setosum, planum. Fl. ♀ : ligulati, marginales 5-6 ; corolla liguliformis 20 mm. longa, tubo 5 mm. longo, extus sursum hirsuto, limbo liguliformi patente, apice recurvo, lineari, 15 mm. longo, 1½ mm. lato, 3-4-nervio, apice truncato emarginato. Fl. ☿ : corolla tubuliformis, regularis, 7-8 mm. longa, tubo basi leviter dilatato, 4 mm. longo, limbo dilato, 4 mm. longo apice 5-lobato, lobis recurvis. Achænia 10 costata, pappus albus 8 mm. longus.

Hab. Tōzan, in montibus Morrison, leg. G. Nakahara, Nov. 1906.

Cirsium DC.

Cirsium chinense Gard. et Champ. in " Hook. Kew Journ. Bot. I. p. 323 "; Walp. Ann. II. p. 945 ; Benth. Fl. Hongk. p. 168.

Cnicus chinensis Maxim. in Mél. Biol. IX. p. 331 ; Forbes et Hemsl. Ind. Fl. Sin. I. p. 461.

Cirsium oreithales Hance in Walp. Ann. II. p. 944.

Cnicus sinensis Clarke, in Hook. f. Fl. Brit. Ind. III. p. 364.

Hab. in monte Morrison, leg. G. Nakahara, 1906 ; Taitō : Bokusekikaku, leg. T. Kawakami et U. Mori, Dec. 1906, (No. 1832) ; Taitō : Giran, leg. G. Nakahara, Jan. 1906, (No. 781) ; Burōkonsha, leg. T. Kawakami et U. Mori, Oct. 1906, (No. 1741).

Distrib. China, Eastern India and Birma.

Observ. Herba erecta, 60 cm. alta, pauce ramosa, primum indumento lanato obtecta, demum glabrata, caulibus valde striatis teretibus. Folia alterna, sessilia linearia, 8 cm. longa, 4 mm. lata, apice aristato-acuminata, basi ad caulem continua, margine remote dentata, dentibus 2-3 approximatis apice spinosis, inter dentes 1 cm. longis spinulosis, supra glabrata, subtus dense albo-lanata, venis primariis utrinque latere 2-3, furcatis, ramis ad apicem dentium attingentibus. Capitula terminalia solitaria, longe pedunculata. Involucrum globosum 1½ cm. in diametro bracteis ∞-seriatis intimis longissimis linearibus 14 mm. longis, 1¼ mm. latis apice dilatatis acutis reflexis scariosis exterioribus gradatim brevioribus extimis brevissimis subulatis (cum spinis) 6 mm. longis basi 1½ mm. latis, crassiusculis apice aristatis, spinis validis 1 mm. longis. Corolla 2 cm. longa, tenuis tubuliformis apice alto lobata, lobis linearibus 5½ mm. longis.

Cirsium Kawakamii Hayata sp. nov. Caulis teres, numeroso-striatus, exsiccato nigricans. Folia alterna sessilia, amplexicaulia, lacerata, 23 cm longa, cum lobis 15 cm. lata, utraque latere 5-6-laceratis, lobis divaricatis, recto-patentibus, 8 cm. longis 1 cm. latis, mediocribus longissimis, partibus centralibus (rhachibus)

4 cm. latis, sinibus inter lobos 2 cm. latis, truncatis, lobis spinosis, 2-3-laccrato-dentatis, apice loborum dentiumque longe spinosis, spinis rectis 1 cm. longis, pagine inermia. Capitulum ad axillas foliorum superiorum solitarium, $2\frac{1}{2}$-3 cm. longum, totiusque latum, ad apicem pedunculorum fere cernuum, longe pedunculatum, (pedunculo gracillimo, 8 cm. longo, parce pubescente), ad basin involucrorum 1-bracteatum, bracteis lanceolatis lacerato-spinosis cum spinis 2 cm. longis. Involucrum late campanulatum, basi truncato-rotundatum 18 mm. longum, bracteatum, bracteis involucri 6-7-seriatis rectis, extimis brevissimis setiformibus, basi leviter dilatatis 8 mm. longis, mediocribus longioribus lineari-lanceolatis, 15 mm. longis apice aristatis, margine ciliato-hirsutis, intimis longissimis lineari-angustatis, 17 mm. longis apice breve aristatis, brevissime duplicato-reflexis, basi attenuatis, margine et dorso tenuiter brevissime pubescentibus, vel glabratis. Receptaculum subplanum vel plano-convexum, læve leviter fasciculis numerosis setæ obtectum, setis circ. 7 mm. longis. Corollæ tubus 12 mm. longus, filiformis, limbo tubuloso-campanulato, 10 mm. longo, profunde 5-lobato, lobis linearibus 5 mm. longis, $\frac{2}{3}$ mm. latis, leviter marginatis, utrinque glabris, apice obtuso-acutis. Stamina longe exserta, ad faucem tubi corollæ affixa, cum filamentis 12 mm. longis, filamentis 6 mm. longis tenuiter barbatis, antheris linearibus 7 mm. longis, apice appendiculatis, appendiculis obtuso-acutis, basi caudatis, caudicibus fimbriato-laceratis. Stylus filiformis 28 mm. longus basi clavatus, ramis $3\frac{1}{2}$ mm. longis linearibus complanatis, apice truncatis, infra ramos leviter tumidus brevissime tomentosus ; stylophora obconica, circ. 1 mm. longa. Achænia oblongo-obovoidea, 4 mm. vel ultra longa 5-costata. Setæ plumosæ 16 mm. longæ rubræ basi annulo affixæ.

Hab. in monte Morrison, leg. T. Kawakami et U. Mori, Oct. 1905, (No. 2279).

Near *C. effusus* Maxim., but differs from it in having much larger involucral bracts. Also near *C. Wallichii* DC. from which my plant is distinguishable by its long pedunculate heads and larger involucral bracts.

Ainsliæa DC.

Ainsliæa okinawensis Hayata sp. nov. Caulis teres exsiccato sulcatus, ferrugineo-tomentosus, 40 cm. altus. Folia versus sursum caulem approximate disposita, longe petiolata, ovato-cordata, vel ovata, circ. 10 cm. longa 6 cm. lata, apice acuta, basi cordata, vel rotundata, ima subito acuta, margine remote undato-repandato-serrulata, undis 7 mm. latis, apice mucronato-aristatis, aristis 1 mm. longis, supra glabra, subtus ad costas et venas fulvo-hirsuta, cæterum subglabra subtus albo-rubescentia. Capitula racemosa, racemis inter folia terminalia subverticillata generaliter geminis, cum pedunculis 20 cm. longis, rhachibus 12 cm. longis. Capitula sessilia 3-florata, cylindrico-campanulata, 1 cm. longa, bracteis 7-seriatim dispositis, extimis brevissimis, intimis longissimis, extimis triangularibus 1 mm. longis, intimis, oblanceolatis, 1 cm. longis utrinque acutis, 1-nerviis. Corollæ tubus 5 mm. longus, limbo liguliformi, 6 mm. longo 4-nervio, apice profunde 5-lobato, lobis linearibus 3 mm. longis $\frac{1}{2}$ mm. latis, marginatis. Stamina exserta, cum filamentis $5\frac{1}{2}$ mm. longa, filamentis 3 mm. longis glabris, antheris linearibus $4\frac{1}{2}$ mm. longis apice truncatis basi profunde sagittatis auriculatis, leviter laceratis vel integris ; stylus filiformis 11 mm. longus, basi ob-cupuliformis, apice 2-fidis, lobis truncatis complanatis. Achænia obconico-cylindrica, 3 mm. longa, apice 1 mm. in diametro, subcompressa, dense

villoso-hirsuta, apice truncata, pappi setæ plumosæ, 7 mm. longæ, basi annulo affixæ.

Hab. Okinawa, leg. Y. Tashiro, Aprili. 1887.

Near *Ainsliæa aptera* DC., but differs from it in having slightly cordate leaves and in the shape of the involucres.

Ainsliæa secundiflora Hayata sp. nov. Herba perennis, pauce lanata, demum glabrata, 30 cm. alta. Folia omnia radicalia, longe petiolata cordata in circumscriptione, 5 cm. longa 4½ cm. lata, palmatim 5-lobata, basi profunde cordata, ad petiolum acuta, lobis basilaribus auriculiformibus apice obtusis vel rotundatis, lobis lateralibus ascendentibus oblongis 1½ cm. longis 12 mm. latis obtusis, sinibus inter lobos rotundatis, lobo terminali longe triangulari 3 cm. longo, 2 cm. lato, apice obtuso, margine grosse undulata, apice undularum et loborum breve mucronata, mucronibus 1 mm. longis, supra glabra, subtus pallidiora, ad nervos lanato-tomentosa, petiolis 8 cm. longis gracillimis hispidis, pilis patentibus. Scapi 25 cm. longi, aphylli, sursum leviter arcuati, gracillimi, hispiduli, partibus florigeris 9 cm. longis, floribus spicatis secunde dispositis. Involucrum cylindrico-campanulatum, 1 cm. longum, bracteis ∞-seriatis, intimis longissimis linearibus 8 mm. longis 1½ mm. latis, 3-nerviis, apice obtusis, margine hyalinis, subplicatis, vel subplicato-teretibus, exterioribus gradatim brevioribus, extimis brevissimis late ovatis obtusis 3-nerviis, additis bracteolis minutis secus pedicellum brevem 4-5 dispositis. Corolla 12 mm. longa, tubuloso-campanulata, lobis linearibus 5 mm. longis, apice acutis. Achænia angustata apice truncata, basi attenuata, adpresse hirsuta, pappus 7 mm. longus ruber, plumosus.

Hab. Kōshūn : Botanrosha, leg. G. Nakahara, Dec. 1906, (No. 922).

The present plant is just intermediate between *A. cordifolia* Fr. et Sav. and *A. apiculata*; It differs from the former in having palmately lobed leaves, and from the latter, in having secund spikes.

Crepis Linn.

Crepis formosana Hayata sp. nov. Herba humilis, 7 cm. alta. Folia omnia radicalia cæspitosa, spathulato-linearia, lyrata, cum petiolis 7 cm. longa, 2 cm. lata, apice rotundata, basi attenuata ad petiolum 1-1½ cm. abeuntia, utraque latere lyrato-lobata, margine remote mucronato-serrulata, lobo terminali majusculo, inferioribus minoribus, infimis minutis, lobis lateralibus descendentibus rotundatis, 1 cm. longis, lobis infimis acutis 2 mm. longis, membranacea, supra minute punctato-pubescentia, subtus brevissime villoso-pubescentia. Capitula ad apicem caulis aphylli paniculata, paniculis pauciforatis, bracteis linearibus minutis. Involucrum cylindricum 5 mm. longum, 3 mm. latum, bracteis 1-seriatis, circ. 8, subliberis lanceolatis, 6 mm. longis, 1½ mm. latis, apice obtusis margine hyalinis, basi dorso subcordatis, basi involucri additis bracteolis ovatis 1 mm. longis. Corolla liguliformis flava. Achænia fusiformi-ovoidea 2⅓ mm. longa, ⅔ mm. lata, leviter compressa, leviter recurva prominente multi-costata, ad costas scabro-hirsuta, apice leviter attenuata, truncata, basi obtusa. Pappi setæ albæ 2 mm. longæ, minute hirsutæ deciduæ.

Hab. Takao, leg. G. Nakahara, Feb. 1906, (No. 825).

Near *C. japonica* Benth., from which the present plant differs in having velvety leaves. I have examined various forms of *C. japonica* from China, Japan, India, and Malaya, in the Herbarium at Kew, but I have not found any form with velvety leaves.

Lactuca Linn.

Lactuca formosana Maxim. in Mél. Biol. IX. p. 353 ; S. Moore in Journ. Bot. (1875), p. 231 ; Forbes et Hemsl. Ind. Fl. Sin. I. p. 482; Matsum. et Hayata Enum. Pl. Formos. p. 212.

Hab. Agincort, leg. T. Kawakami, Mai. 1907.

Distrib. China : Chekiang ; Kiangsi.

Observ. Herba validiuscula, 50-70 cm. alta, ramosa, caulibus erectis ferrugineo tomentosis. Folia alterna sessilia, amplexicaulia, obovata in circumscriptione, 10 cm. longa, 7 cm. lata, transversim alternatimque 5-7-lobata, lobo terminali latissimo 5 cm. longo 6 cm. lato, irregulariter lobulato transverse dentato, apice cuspidato (cuspide $1\frac{1}{2}$ cm. longo $\frac{1}{2}$ cm. lato), lobis lateralibus approximatis transverse dispositis, ovatis 5 cm. longis $2\frac{1}{2}$-3 cm. latis, apice breve cuspidatis irregulariter dentatis, dentibus acutis, lobis basilaribus minoribus conformibus, (sinibus rotundato-obtusis), basi amplexicaulia auriculata, auriculis 1 cm. longis et latis lacerato-dentatis utraque pagine ferrugineo-hispida, subtus ad costas venasque pilis strigosis 1-2 mm. longis 1-seriatim obtecta. Capitula paniculato-cymosa. Involucrum campanulatum, 1 cm. longum, 6 mm. latum, bracteis 3-4-seriatim dispositis, intus longissimis oblongo-lanceolatis, 1 cm. longis, 3 mm. latis, apice obtusis basi leviter contractis, exterioribus gradatim brevioribus, extimis minoribus ovatis $3\frac{1}{2}$ mm. longis 2 mm. latis apice acutis basi cordatis. Flores perfecti non visi.

Near *L. brevirostris*, but quite distinguishable by its transversely and deeply lobed leaves and by being tomentose all over the plant. The leaves is like those of *L. Scariola*, but the former are tomentose, while the latter are entirely glabrous.

Campanulacæ.

Codonopsis Wall.

Codonopsis Kawakamii Hayata sp. nov. Herba tenuissima, scandens, parce hirsuta, ramis teretibus, foliosis, foliis semper ad axillas ramuliferis. Folia alterna ovata vel triangulari-ovata, 13 mm. longa, 8 mm. lata, apice obtusa vel acuta, basi truncato-rotundata, vel rotundato-acuta, supra breve subtus longe hirsuta, pilis 1 mm. longis patentibus, pinninervia herbacea, petiolis 5 mm. longis, ramulis axillaribus generaliter brevibus 5 mm. longis, foliis parvioribus. Capsulæ longe pedunculatæ, turbinatæ, 1 cm. longæ, totiusque latæ apice triangulari-pyramidales, cupulis calycis basi late rotundato-semiglobosis 6 mm. longis, 10-costatis, lobis calycis persistentibus triangularibus 7 mm. longis, 4 mm. latis, membranaceis, marginibus cupularum elevatis, inter lobos calycis loculicide 3-valvatim dehiscentes. Semina elliptica utrinque rotundata, 1 mm. longa, $\frac{2}{3}$ mm. lata, leviter compressa, lævia, rubra, basi maculata.

Hab. Mt. Morrison, leg. G. Nakahara et T. Kawakami, 1905, Nov.

Very remarkable for its very small leaves. The leaves are as small as those of *C. fœtens* H.K. et T. and *C. thalictrifolia* Wall., but not so densely hairy as the former, nor so velvety as the latter. Also near *C. orata* Benth., but differs from it in having much smaller leaves.

Adenophora Fisch.

Adenophora morrisonensis Hayata sp. nov.

Adenophora polymorpha var. *coronipifolia* Hayata Fl. Mont. Formos. p. 148, (non Trautv.) Herba gracilis basi suffrutescens,

35 cm. alta, cauli præter inflorescentiam simplici, angulato, pubescente vel subglabrato, angulis acutis. Folia ad partem inferiorem caulis approximatim alternatim disposita, lanceolata, lineari-lanceolata, vel linearia, 5-8 cm. longa, apice acuminata, basi sessilia leviter angustata, margine approximate vel remotissime serrulata, utraque glabrata vel pubescentia, foliis superioribus semper minoribus angustioribus paucissimis. Racemi terminales, simplices, vel paucissime ramosi, 10-20 cm. longi, bracteati, bracteis lanceolatis vel linearibus circ. 1-2 cm. longis, pedicellis 1-1½ cm. longis, bracteolis linearibus. Calyces tubuloso-subglobosi, 3 mm. longi, 5-costati, limbis 5-partitis, laciniis lanceolatis, 7 mm. longis 1½ mm. latis, glabris, utrinque latere 2-serrulatis, serrulis obtusis ascendento-recurvis, dorso 1-costatis. Corollæ campanulatæ cæruleæ 2 cm. longæ, totiusque latæ leviter 5-lobatæ, lobis rotundato-triangularibus 6 mm. longis, 7 mm. latis, apice mucronatis, 1-nervatis, nervis ad apicem loborum attingentibus. Stamina 5, cum filamentis 13 mm. longa, inclusa, filamentis 8 mm. longis, sursum filiformibus, deorsum dilatatis, partibus dilatatis elongate triangulari-ovatis 4 mm. longis, 1½ mm. latis, margine ciliato-barbatis, partibus filiformibus duplicato-reflexis, 4 mm. logis, ⅕ mm. latis, glabris, antheris linearibus 5 mm. longis ½ mm. latis, apice obtusis basi emarginatis. Discus elevatus, lato-cylindricus, ⅔ mm. longus, basin styli amplectans. Styli filiformes, 2 cm. longi, apice leviter gradatim dilatato-clavati, apice 2-lobati, lobis latis brevissimis.

Hab. in monte Morrison, leg. T. Kawakami et U. Mori, (Nos. 1942 et 2290) ; (No. 7331, Nagasawa).

Near *A. polymorpha* Ledeb. and its varieties, but differs from them in having much narrower caylx-lobes. I have examined a considerable number of the named species and its varieties preserved at Kew, but I have not found any specimen with so narrow and serrate calyx-lobes

as the present plant. It is also near *A. khasiana* H. f. et T., but quite distinguishable by its very much narrower leaves and also by its narrower serrate calyx-lobes. Plants belonging to this genus are generally very variable, still the points above mentioned may be regarded as comparatively fixed characters. So far as my observations extend, the present plant is quite distinct from any species of the genus.

Vacciniaceæ.

Vaccinium Linn.

Vaccinium formosanum Hayata sp. nov. Rami fusco-purpurascentes, minute rugulosi, ramulis gracilibus teretibus cinerascentibus, cicatricibus foliorum remote notatis, pulvinis elevatis, superiore gracillimis pubescentibus. Folia obovata, vel oblonga, coriacea, 3 cm. longa, 16 mm. lata, apice acuta vel aristato-acuta, vel callosoacuta, basi acuta, margine callosiuscula leviter reflexa serrata, serris ascendentibus, latiusculis, prope basin subintegra, costis et venis supra inconspicuis, subtus tenuissime elevatis, venis primariis lateralibus utrinque 3-4, tenuissimis, exsiccato supra pallida, subtus pallido-rubescentia, petiolis 3 mm. longis supra sulcatis. Racemi terminales 7½ cm. longi, pedunculis 1½ cm. longis, parcissime pubescentibus vel glabratis ad insertionem pedicellorum 1-bracteatis, bracteis valde conspicuis, ovatis 1½ cm. longis 7 mm. latis, folio circ. conformibus, pedicellis 1½ cm. longis. Baccæ globosæ, 5 mm. in diametro, rubræ, apice calycis lobis late triangularibus 1 mm. latis arcte clausis coronatæ.

Hab. Taitō : Taruko, leg. G. Nakahara, 1906, Jan. (No. 695).

The present plant is near *V. bracteatum* Thunb., but differs from it in having smaller leaves and in the persistent calyx-lobes. Also

near *V. Griffithianum* WIGHT and *V. Macgillivrayi*, SEEM. but distinguishable from the former by its smaller adpressed calyx-lobes which crown the fruit and from the latter by the much smaller calyx and long pedunculate fruit.

Vaccinicum japonicum THUNB. var. **ciliare** MATSUM. (in sched.). in Herb. Tōkyō.

HAB. Randaisan, leg. U. MORI, 1908.

DISTRIB. The variety is limited to the southern part of Japan. Compared with a specimen so labelled at the Tōkyō Herbarium. The description of the variety is not yet published.

Vaccinium randaiense HAYATA sp. nov. Rami graciles fusco-cinerascentes, rugulosi, ramulis gracillimis, foliatis. Folia lanceolata vel oblongo-lanceolata, chartaceo-coriacea, 5-7 cm. longa, $1\frac{1}{2}$-2 cm. lata, apice cuspidato-acuminata, basi rotundata, rotundato-acuta, vel cuneato-acuta, margine adpresso-serrulato-integra, serrulis obtusis remotis prope apicem et basin subintegra, pinninervia, basi obscure tri-nervia, costis et venis supra non elevatis inconspicuis, subtus tenuiter elevatis, gracilibus, petiolis brevibus 2-3 mm. longis. Racemi ramosi terminales 10-15 cm. longi graciles, floribus secundatis, pedicellis 5-6 mm. longis, calycis lobis triangularibus acutis glabris, ciliolatis. Stamina cum filamentis 5 mm. longa, filamentis $2\frac{1}{2}$ mm. longis, barbatis. Antheræ lineares $2\frac{1}{2}$ mm. longæ, prope basin affixæ, dorso breve 2-calcaratæ, calcaribus brevissimis $\frac{1}{3}$ mm. longis, transversim patentibus, apice attenuatæ 2-fidæ, locellis apice acutis, leviter reflexis, poris ovalibus margine dehiscentibus, basi connatis rotundatis. Ovarium apice dense barbatum.

HAB. Randaisan, leg. T. KAWAKAMI et U. MORI, 1908, Aug. (No. 7004).

The present plant comes near *V. bracteatum* THUNB. from which it is distinguishable by its more acuminate or even caudate leaves and by its larger and glabrous calyx. Also near *V. Carlesii* DUNN, and *V. malaccense* WIGHT ; but differs from the former in having leaves, obtusely serrulate on the margin, more or less acute at the base, and from the latter in having glabrous calyx.

Ericaceæ.

Gaultheria LINN.

Gaultheria bornensis STAPF in Trans. LINN. Soc. Bot. II. 4, (1894), p. 190, t. 15, f. C, 4-6 ; RENDLE in Journ. Bot. (1896) p.355 ; Merrill in Philip. Journ. Sci. III. Suppl. p. 378.

Gaultheria Itoana HAYATA Fl. Mont. Formos. p. 150, t. XXV.

DISTRIB. Borneo and Luzon.

After the publication of my paper above mentioned, my attention was called, by Mr. E. D. Merrill of the Bureau of Science, P.I., to a Bornean species described by Dr. O. STAPF. At that time, I could not compare my plant with the named species, as there was nothing of the Borneoan collection in the Tōkyō Herbarium, nor is the paper of Dr. O. STAPF accessible to me. Since coming to Kew, I have compared my plant with the type of the same species, and found that they are exactly identical, as Mr. E. D. Merrill suggested to me some years ago.

Pieris DON.

Pieris taiwanensis HAYATA sp. nov.

Pieris formosa MATSUM. in Tōkyō Bot. Mag. XIV. p. 59 ; MATSUM. et HAYATA Enum. Pl. Formos. p. 219; HAYATA Fl. Mont. Formos. p. 151.

Rami recti, glabri fulvo-cinerascentes, longitudinaliter sulcato-rugulosi, cicatricibus foliorum notati, pulvinis elevatis, ramulis ut videtur cæspitosis rectis suberectis, apice foliatis. Folia ad apicem ramulorum approximate disposita coriacea sessilia, oblongo-obovata, vel oblongo-oblanceolata, 6½ cm. longa, 2 cm. lata, apice cuspidato-acuta vel acuta, basi cuneata, vel cuneato-attenuata, margine a medio sursum crenato-serrata, serris obtusis vel obtusissimis, deorsum integra, ad marginem subcallosa, plus minus reflexa, utraque glabra, supra costis prope basin sulcatis, prominentibus, subtus leviter elevatis, venis primariis lateralibus tenuissimis, supra tenuiter impressis, subtus planis inconspicuis, exsiccato supra fulvo-rubescentia, subtus pallidiora, petiolis brevissimis 3-5 mm. longis, supra sulcatis. Racemi ad apicem ramulorum 3-4-fasciculati, dense florati, pauce ramosi, 6 cm. longi, pedunculis 1-2 cm. longis, pedicellis 4-5 mm. longis, floribus cernuis. Calyx 5-partitus, laciniis 3½ mm. longis, 2 mm. latis, ovatis, acutis, crassiusculis, extus glabris intus pubescentibus. Corolla urceolata 7 mm. longa, 4½ mm. lata, infra apicem contracta, 5-lobata, lobis latis rotundatis 1 mm. longis, 1½ mm. latis patentibus. Stamina 10, 4 mm. longa, ad basin corollæ affixa, filamentis 2½ mm. longis, incrassatis complanatis barbatis, medio 1-rubro-striatis, apice supra antherarum insertionem 2-calcaratis, calcaribus 1½ mm. longis recurvato-pendulis, rubris, antheris oblongis 2½ mm. longis dorso medio affixis apice 2 fidis, locellis apice acutis, poro ovali dehiscentibus basi connatis emarginatis. Discus 10-lobus rotundatus ¼ mm. longus. Ovarium late globosum, 2 mm. latum apice 5-loculare. Stylus columnaris 5 mm. longus, basi intra ovarium intrusus, stigmate truncato. Capsulæ late globosæ 5 mm. longæ, 6 mm. latæ, elobatæ, 5-loculares, valvis medio septiferis ab axi persistente placentifero solutis, loculis polyspermis. Semina scobiformia, cum alis 2½ mm. longa, ½ mm. lata, utrinque alata, rubescentia.

Hab. Taitō : Daironsan, leg. T. Kawakami et U. Mori, (No. 2184).

The present plant was first identified with *Pieris formosa* D. Don by Prof. J. Matsumura. I was also of the same opinion as the Professor regarding the reference of the plant, as the figures given in Wight, Ic Pl. t. 1200 quite agree with it. Since coming to Kew, when I have examined the type of *P. formosa* D. Don, I have, however, found that the type does not agree with the Formosan plant. The inflorescence of the latter spreads less, the flowers are smaller, the leaves are obovately spathulate, less acute at the apex, more obtusely serrate on the margin, and very faintly reticulated on the surface. There are at Kew some specimens from continental China, referred to *P. formosa* D. Don. They are also different from my plant.

Rhododendron Linn.

Rhododendron Kawakamii Hayata sp. nov. Frutex, ramis gracilibus cortice cinerascente vestitis, ramulis apice rubescentibus rugosis. Folia breve petiolata, obovata, 3½ cm. longa, 17 mm. lata, apice rotundata, basi acuta vel cuneata, utrinque glabra, coriacea, crassiuscula, margine leviter recurva vel revoluta, supra viridia glabra nitida costis venisque impressis, subtus costis prominente elevatis, venis leviter elevatis vel inconspicuis, albo-flavescentia minute atropunctata, venis primariis mediocribus ad costas angulo 60 egressis, basilaribus angulo 40° egressis, utrinque latere 4. Alabastra ovoidea acuta, 13 mm. longa, 8 mm. lata. Flores ad apicem ramorum terminales, umbellati, umbellis basi bracteatis, bracteis ∞-seriatis, exterioribus brevibus, concavis rotundatis 8 mm. longis 7 mm. latis, medio sursum punctatis margine ciliolatis, mediocribus longissimis 12 mm. longis, spathulatis, intimis linearibus 8 mm.

longis, 1 mm. latis, apice truncatis ciliolatis. Flores extus glanduloso-punctati, pedicellis 1 cm. longis, glanduloso-punctatis declinatis. Calyx patelliformis $1\frac{1}{2}$ mm. longus $3\frac{1}{2}$ mm. latus, 5-lobatus, lobis inæqualibus glanduloso-ciliolatis, lobo infimo oblongo vel lanceolato 2 mm. longo, cæteris triangularibus 1 mm. longis totiusque latis crassiusculis persistentibus. Corolla campanulato-hypocraterimorpha 1 cm. longa, tubo latiore, 4 mm. longo, 5 mm. lato, limbo 12 mm. in diametro, lobis late oblongis $5\frac{1}{2}$ mm. longis, 4 mm. latis, apice rotundatis. Stamina 10, 2-seriata, filamentis inæqualibus circ. 6 mm. longis, basi barbatis crassiusculis, antheris oblongis $2\frac{1}{2}$ mm. longis, apice 2-porosis. Ovarium ovoideum 2 mm. longum, $1\frac{1}{2}$ mm. latum 5-lobatum, brevissime pubescens, stylo declinato 5 mm. longo crassiusculo 5-sulcato, apice capitellato, disco annulari 10 lobato. Capsula longe pedicellata, (pedicellis $2\frac{1}{2}$ cm. longis, calycis lobis persistentibus erectis vel reflexis), cylindrico-clavata, basi angusta apice latior et truncata, minute glanduloso-punctata, et dense pubescens, 12 mm. longa, 5 mm. lata, septicide dehiscens valvis 5, reflexis horizontaliter patentibus. Semina linearia 3 mm. longa, $\frac{1}{3}$ mm. lata, testa alata, alis utrinque acuminatis, vel lobatis.

Hab. in monte Morrison, ad 7000 ped. alt., leg. T. Kawakami et U. Mori, Oct. 1906, (No. 2005); Randaizan, leg. B. Hayata et U. Mori, Aug. 1908, (Nos. 7002 et 7043).

The flowers of the present plant are near *R. pumilum* of Himalaya, but the habit is quite different. Somewhat near *R. anthopogonoides* Maxim., but greatly differs from it in having much elongated bracts, and obovate emarginate leaves which are glabrous above, and glandulose below. Comes nearer *R. emarginatum* Hemsl. et E. H. Wilson, from which this is distinguishable by the larger lobes of the calyx and shorter, broader, thicker, and more conspicuously gland-dotted leaves.

Rhododendron Morii HAYATA sp. nov. Rami divaricati, cortice albo-cinerascente vestiti. Folia ad apicem ramorum conferta, petiolata, oblongo-lanceolata, 9½ cm. longa, 27 mm. lata, apice acuta vel breve acuminata, basi rotundata, venis primariis utrinque latere 14, ad costas angulo 50° egressis, subtus costis prominentibus, venulis minute reticulatis, subtus indumento lanato deciduissimo obtecta, utrinque demum, glabrata, petiolis 1½ cm. longis. Flores terminales 5-6-umbellati, pedicellis 2 cm. longis, paleis lanceolatis obtectis. Calyx 5-dentatus, dentibus triangularibus. Corolla campanulati-infundibuliformis 3½ cm. longa, 2-labiata, labio superiore trilobato, inferiore 2-lobato, lobis subæqualibus 13 mm. longis, 16 mm. latis, rotundatis, emarginatis, fauce superiore latere punctata glabra. Capsula cylindrica arcuata, pilis strigosis brevibus obtecta, septicide dehiscens. Semina oblonga complanata, 3 mm. longa 1 mm. lata, testa alata utrinque laciniata, minute et longitudinaliter reticulata.

HAB. Randaizan, leg. U. MORI, Aug. 1906, (No. 7041); Arizan, in monte Morrison, leg. G. NAKAHARA, Oct. 1906.

Very like *R. pachytrichum* FRANCH. in the shape of the leaf-buds, but differs in not having so much hirsute petioles.

Rhododendron rubro-pilosum HAYATA sp. nov. Rami costice fusco-cinerascente vestiti, ramulis subgracilibus adpresse tomentosis fusco-rubescentibus, novellis paleis lanceolatis rubris 1 mm. longis albo-marginatis dense adpresseque obtectis. Folia alterna vel subopposita, petiolata, lanceolato-oblonga, 4 cm. longa, 17 mm. lata, apice acuta glanduloso-mucronata, basi acuta, margine integra leviter recurva, coriacea, supra exsiccato nigricantia, subtus pallidissima supra rugosa et scaberrima, pilis brevibus strigosis parce obtecta, subtus ad costas paleis lanceolatis adpresse denseque obtecta, ad venam et paginem pilis strigosis ferrugineis dispersa,

venis primariis utrinque 5-6, venulis utrinque impressis reticulatis, intervenuliis utrinque elevatis, petiolis 1 cm. longis paleis lanceolatis adpresse strigosis. Alabastrum foliorum ovoideum 8 mm. longum, 5 mm. latum, basi 2-3-foliolis parvis suffultum, foliolis parvis 8 mm. longis basi dilatatis, perulis ferrugineo-sericeis ovatis acutis. Capsula cylindrica, 1 cm. longa, 4 mm. lata, pilis strigosis dense obtecta, septicide dehiscens, valvis erectis, calycis lobis persistentibus, oblongis 4 mm. longis, pilis strigosis dense obtectis, stylo persistente strigoso. Semina subteretia 1 mm. longa, $\frac{1}{4}$ mm. lata, plus minus angulata, non alata, vel alis brevissimis.

HAB. Tōzan, in montibus Morrison, leg. G. NAKAHARA, Oct. 1906 ; in Montibus Centralibus, leg. T. KAWAKAMI et U. MORI, Nov. 1906, (Nos. 1857 et 1859) ; Randaizan, leg. B. HAYATA et U. MORI, Aug. 1908, (No. 7044).

Rhododendron shojœnse HAYATA sp. nov. Rami graciles teretes, corticibus cinerascentibus longitudinaliter rugulosis demum solutis, ramulis rubescentibus, teretibus, ad ramificationem cicatricibus foliorum transverse approximateque notatis, ad apicem ramulorum 2-3-foliatis, foliis suboppositis. Folia ovato-rhomboidea, circ. 3 cm. longa 2 cm. lata, apice calloso-obtusa, basi acuta, margine subintegra, vel leviter crenulato-integra, supra costis et venis leviter impressis subtus tenuiter prominentibus venulis distincte reticulatis, costis venis venulisque rubescentibus, pagina subtus albicantia, venis primariis lateralibus utraque latere 2-3, arcuato-ascendentibus. Fructus terminales, solitarii, pedunculis 7 mm. longis dense strigoso-tomentosis, pilis rubescentibus 1-2 mm. longis adpressis. Capsulæ cylindricæ $1\frac{1}{2}$ cm. longæ, 4 mm. latæ leviter recurvatæ strigoso-pilosæ, pilis rubescentibus longiusculis adpressis, apice stylis persistentibus coronatæ, basi calycibus circ. obsoletis, stylis

filiformibus recurvatis 4 cm. longis apice capitatis. Semina minute oblongo-complanata, $\frac{2}{3}$ mm. longa.

Hab. Nantō : Shojō, leg. T. Kawakami et U. Mori, 1905, Aug. (No. 1160).

Near *R. Farreræ* Tate, which has leaves much acuter at both ends, less reddish beneath, and has soft villose fruit and pedicels. Also near *R. dilatatum* Miq., but quite distinguishable by the smaller leaves and densely pilose capsules ; from *R. rhombicum* Miq., this differs in having longer leaves and much more densely pilose capsules. It comes most near *R. Farreræ* Tate, with which it may, perhaps, be indentical.

Plumbagineæ.

Statice Linn.

Statice sinensis Girard in "Ann.. Sc. Nat. 3-Série II. p. 329 " ; DC. Prodr. XII. p. 646 ; Benth. Fl. Hongk. p. 281 ; Forbes et Hemsl. Ind. Fl. Sin. II. p. 35 .

Statice Wrightii Hayata in Matsum. et Hayata Enum. Pl. Formos. p. 220, (non Hance).

Hab. Shintiku: Chūkō, Aprili. 1895, (No. 31, A.) leg.Y. Tashiro.

Distrib. China : Shingking, Shangtung, Fokien, Kwangtung, Hongkong, Hainan. Corea.

Compared with a specimen at Kew.

Primulaceæ.

Lysimachia Linn.

Lysimachia fragrans Hayata sp. nov. Herba ascendens basi pro-

cumbens ad nodos radicans, ad totam longitudinem foliata, angulata, subalata, glabra, vel subglabrata, 40 cm. alta. Folia membranacea rhomboideo-ovata, 4½ cm. longa, 22 mm. lata, apice calloso-aristata, acuta, basi rotundata, subito cuspidato-attenuata, vel abrupte cuneato-angustata, ad petiolum 1 cm. longum attenuata, margine subintegra vel sursum tenuissime serrato-integra, prope basin integerrima supra parcissime brevissime tenuissime pubescentia. Flores fragrantes axillares, longe pedunculati, solitarii, pedunculis 4 cm. longis gracillimis, apice cernuis. Calyx 5-fidus, laciniis lanceolatis 4 mm. longis 1½ mm. latis. Corolla campanulata, 5-fida, laciniis ovatis 5 mm. longis, 2½ mm. latis, apice rotundato-acutis. Stamina 5, cum filamentis 4½ mm. longa, basin corollæ adnata, filamentis basi dilatatis in tubum brevissimum connatis, (tubo filamentorum 1 mm. alto,) apice angustissimis liberis, partibus liberis ½ mm. longis, antheris linearibus apice obtuso-mucronatis basi obtuso-sagittatis, 3½ mm. longis, basifixs apice poris dehiscentibus. Ovarium conico-globosum 5-albo-striatum, 1-loculare, placenta centrali, stylo columnari apice obtuso.

Hab. Randaizan, leg. B. Hayata et U. Mori, 1908, Aug. (No. 7126).

Near *L. fœnum-græcum* Hance and *L. capillipes* Hemsl., but differs from the former in having very much smaller flowers, and from the latter, in having much larger calyx and herbaceous leaves. The filaments of the present plant are connate forming a very short tube, the stamens are opposite the petals, and the anthers are opened by terminal pores facing outward, though they are, however, originally introrse.

Myrsineæ.

Mæsa Forsk.

Mæsa randaiensis Hayata sp. nov. Rami recti fuscentes lenticellis prominentibus densiuscule notati, subglabrati, ramulis gracilibus rectis, foliatis. Folia chartaceo-coriacea, angusto-lanceolata, vel lanceolata, 8 cm. longa, 1½ cm. lata, apice acuminata, basi obtusa, plus minus obliqua, margine remotissime serrulata, serrulis minutis ½ mm. longis mucronatis 1 cm. a se remotis, utraque glabra, costis et venis planïs inconspicuis vel tenuissimis, subtus pallidissima, petiolis 7 mm. longis supra sulcatis. Racemi axillares, 3 cm. longi, bracteis minutis ovatis 1 mm. longis, pedicellis 5 mm. longis, prope apicem pedicellorum 1-bracteolatis, ovatis 1 mm. longis Calyx campanulatus, limbo 5-lobato, lobis rotundato-triangularibus 1½ mm. longis, 2 mm. latis, crassiusculis margine denticulatis, apice obtuso-rotundatis. Corolla glabra, urceolato-cylindrica, 6 mm. longa, 3 mm. lata, tubo apice sub lobis leviter contracto, 5-lobata, lobis late rotundatis, erecto-patentibus 1¼ mm. longis 2 mm. latis apice rotundatis basi leviter auriculatis, margine minute denticulatis. Stamina corollæ lobis opposita, cum filamentis 5 mm. longa, prope basin corollæ affixa, antheris ovatis 1⅕ mm. longis. Ovarium semi-superius apice conicum ad stylum attenuatum. Stylus brevior, circ. 1 mm. longus, apice leviter 3-lobatus.

Hab. Randaizan, leg. T. Kawakami et U. Mori, Mart. 1908, (No. 8547).

This comes near *Mæsa Doræna* Bl., but differs from it in having very much looser racemes, larger flowers, and narrower leaves.

Mæsa sinensis A. DC. ; BENTH. Fl. Hongk. p. 208 ; FORBES et HEMSL. Ind. Fl. Sin. II. p. 60 ; MATSUM. et HAYATA Enum Pl. Formos. p. 225.

Mæsa Dorœna HAYATA in MATSUM. et HAYATA Enum. Pl. Formos. p. 224, (non BLUME).

HAB. Nantō : Mushazan, leg. T. KAWAKAMI et U. MORI, Aug. 1906, (No. 1147) ; Randaizan, leg. B. HAYATA et U. MORI, Aug. 1908, (No. 7020) ; Nantō : Hinokiyama, leg. G. NAKAHARA, Feb. 1907.

DISTRIB. China : Kwangtung.

Myrsine LINN.

Myrsine capitellata WALL. ; BENTH. Fl. Hongk. p. 512 ; HOOK. f. Fl. Brit. Ind. III. p. 512 ; Bot. Mag. t. 3222 ; FORBES et HEMSL. Ind. Fl. Sin. II. p. 61 ; MATSUM. et HAYATA Enum. Pl. Formos. p. 225.

HAB. Uraisha, leg. N. KONISHI, Oct. 1907, (No. 74) ; Byōritsu, Hakkeirin, leg. T. KAWAKAMI et U. MORI, Juli. 1906, (No. 1097).

DISTRIB.

Myrsine marginata MEZ in Engl. Pfl.-reich IV. 236, Myrsinaceæ, p. 339.

OBSERV. Rami et ramuli gracillimi, cortice rugoso atro-rubescente glabro. Folia alterna remota, petiolata, coriacco-membranacea obovata vel obovato-lanceolata, 6 cm. longa, $2\frac{1}{2}$ cm. lata, apice gradatim vel abrupte acuta ad summum obtusa, basin gradatim acuta, utrinque glabra pallidiora costis supra impressis subtus prominentibus, venis et venulis utrinque pagine elevatis, venis primariis 9, ad costas angulo 40° egressis, prope marginem curvatis anastomosantibus ultra reticulatis, venulis reticulatis, subtus minute parceque punctata margine integra, petiolis 5 mm.

longis. Flores axillares 5-6-fasciculati basi fasciculorum bracteati, bracteis brevibus, subulatis, pedicellis 4 mm. longis glabris. Calyx late campanulatus, 1 mm. longus, $1\frac{2}{3}$ mm. in diametro, 5-partitus, segmentis oblongis apice obtusis 1 mm. longis, $\frac{1}{2}$ mm. latis, rubro-punctatis, crassiusculis. Corolla rotata crassiuscula $2\frac{1}{2}$ mm. longa, 4 mm. in diametro, 4-partita, segmentis oblongo-angustatis vel obovatis apice truncatis vel obtusis subæqualibus, valvatis albis 2 mm. longis, $\frac{2}{3}$ mm. latis, punctatis, punctis rubro-purpurascentibus, tubo brevi $\frac{1}{3}$ mm. longo. Stamina 5, basin segmenti corollæ affixa, iis opposita, $\frac{3}{4}$ mm. longa, filamentis crassiusculis $\frac{2}{3}$ mm. longis, antheris dorsifixis reniformi-cordatis latioribus quam longis, $\frac{1}{3}$ mm. longis, connectives leviter productis obtusis, loculis 2, subdivaricatis, introrsum longitudinaliter dehiscentibus crassiusculis. Ovarium ovatum $\frac{3}{4}$ mm. longum sursum punctatum apice in stylum brevem attenuatum, stigmate punctiformi, 1-loculare, ovulis paucis in placenta globosa immersis. Fructus globosus 4 mm. in diametro, endocarpio crustaceo longitudinaliter striato, 1-spermus. Semina depresso-globosa 3 mm. lata 2 mm. longa, basi profunde excavata, reliquiis placentæ membranaceis, albumine corneo-lævi; embryo cylindraceus transversus curvatus, cotyledones parvæ, radicula æquilatæ.

Embelia Juss.

Embelia sp. Scandens, rami et ramuli graciles, cortice cinerascente. Folia opposita breve petiolata, obovata, 36 mm. longa, 15 mm. lata, apice acuta, basi attenuata, costis supra impressis subtus elevatis, venis et venulis utrinque pagine elevatis, glabra, petiolis 3 mm. longis. Paniculæ ad apicem ramulorum brevium terminales. Flores non visi.

Hab. Atamusha, Aug. G. Nakahara, 1905, (No. 343).

Ardisia Sw.

Ardisia chinensis Benth. Fl. Hongk. p. 207.

Hab. Shinkō : Shirakku, leg. T. Kawakami et U. Mori Juni. 1906, (No. 1396).

Near *A. japonica* Blume.

Distrib. Hongkong.

Ardisia cornudentata Mez Myrsinaceæ, in Engl. Pfl.-reich IV. 236, p. 144.

Hab. Taitō : Shinsuiye, (No. 2908) ; Shinkō ; Urai, (No. 5071) ; Kwashōtō, (No. 4822) ; Garanbi, (No. 854).

Distrib. An endemic plant.

Ardisia crenata Roxb. "Fl. Ind. ed.-Carey et Willd. II. p. 276" ; Clarke, in Hook. f. Fl. Brit. Ind. III. p. 524.

Hab. in Montibus Centralibus, leg. T. Kawakami et U. Mori, Nov. 1906, (No. 1933) ; Tōzan, in montibus Morrison, leg. G. Nakahara, Oct. 1906.

Distrib. Malaya, India, China, Japan.

Ardisia kotœnsis Hayata sp. nov. Rami et ramuli validiusculi, fusco-tomentosi, cortice fusco-rubescente glabrato vel fusco-tomentoso, lenticellis longitudinaliter dispersis, et cicatricibus semiglobosis notati. Folia alterna subsessilia crassiuscula longe obovata, 10 cm. longa, 4½ cm. lata, apice obtusa vel rotundata vel obtuso-acuta, basi attenuata, margine leviter recurvata, costis et venis utraque leviter elevatis vel inconspicuis, venis primariis utrinque latere 12, a costa angulo 60° egressis, prope marginem curvatis anastomosantibus, exsiccato pallidiora. Cymæ axillares pedunculatæ,

pedunculis 6 cm. longis. Flores 8 mm. longi, pedicellis 1½ cm. longis. Calyx 5-partitus, segmentis patentibus, rotundatis 2 mm. longis, imbricatis, punctatis, punctis albo-purpureis. Corolla rotata 5-partita, segmentis ovatis 8 mm. longis 6 mm. latis, apice acutis, punctatis, punctis, atropurpureis. Stamina 5, basin corollæ affixa, subsessilia, (vel filamentis brevibus, dilatatis, latis), 1½ mm. longa totiusque lata, apiculata. Ovarium globosum apice in stylum filiformem 6 mm. longum attenuatum. Fructus ignotus.

Hab. Kōtōshō, Taitō, leg. T. Kawakami.

Near *A. Moonii* C. B. Clarke; but differs from it in the leaves which are quite rounded at the apex.

Ardisia morrisonensis Hayata sp. nov. Frutex, ramis validis, cortice fusco-cinerascente, lenticellatis, cicatricibus foliorum globosis notatis, ramulis rubescentibus, subglabratis, sursum ferrugineo-tomentosis. Folia alterna, breve petiolata, lanceolata, vel oblanceolata, 6 cm. longa, 28 mm. lata, apice acuta, basi longe attenuata, margine remote serrata, serris acuminatis ascendentibus, costis supra impressis, subtus elevatis, venis primariis numerosis ramosis, supra glabra, subtus parce tomentosa, pauce punctata vel epunctata, petiolis 7 mm. longis ferrugineo-fuscentibus. Cymæ axillares, longe pedunculatæ, pedunculis 10 cm. longis, apice 3-4 approximate foliatis, simplicibus vel pauce ramosis, floribus ad apicem pedunculorum umbellatim dispositis, pedicellis 14 mm. longis. Calyx 5-lobatus, lobis dextrorsum obtegentibus rotundatis 2 mm. longis. Fructus globosus, 5 mm. in diametro aequans.

Hab. Suizan, in montibus Morrison, ad 7702 ped. alt., Oct. 1905, (No. 671); Tōseikaku, Suiteiryō, Soobonsha, leg. C. Owatari, Jan. 1897; Taitōchō: Raikōkwa, leg. K. Miyake, Dec. 1899; Toroku: Washa, leg. T. Kawakami et U. Mori, Nov. 1906, (No. 1912).

Very near *A. cornudentata* MEZ, but differs from it in having ferrugineo-tomentose leaves which are turned reddish black when dried.

Ardisia pusilla A. DC. in "Trans. LINN. Soc. XVII. p. 126" et Prodr. VIII. p. 137 ; MIQ. in Ann. Mus. Bot. Lugd.-Bat. II. p. 263 ; HANCE in Journ. Bot. (1883), p. 322 ; FORBES et HEMSL. Ind. Fl. Sin. II. p. 66.

Bladhia villosa THUNB. Fl. Jap. p. 96, t. 19.

HAB. Oshima, leg. T. UCHIYAMA, Dec. 1900.

DISTRIB. Kwangtung and Japan.

Ardisia rectangularis HAYATA sp. nov. Suffrutex, caulibus erectis, simplicibus glabris cinerascentibus, 30-50 cm. altis. Folia alterna petiolata, oblongo-lanceolata, 11 cm. longa 3 cm. lata apice acuminata basi acuta, costis supra impressis, subtus prominentibus, venis utrinque pagine prominulis, venis primariis 30, a costa angulo 50° egressis, prope marginem anastomosantibus, utraque pagine glabra pallidiora, subtus minute punctata, petiolis 1 cm. longis. Cymæ terminales inclinatæ, sessiles, breves, 2 cm. longæ, 10 cm. latæ, ramis gracilibus, rectangulariter divaricatis, floribus ad apicem ramorum 5-6, pedicellis $1\frac{1}{2}$ cm. longis. Calyx 5-partitus, segmentis ovatis 2 mm. longis apice rotundatis imbricatis, punctatis, punctis atro-purpureis. Corolla rotata, $5\frac{1}{2}$ mm. longa, tubo brevi $\frac{1}{2}$ mm. longo, limbo 5-partito, segmentis ovatis 5 mm. longis $3\frac{1}{2}$ mm. latis apice obtusis, punctatis, punctis atro-rubris, dextrorsum obtegentibus. Stamina 5, fauce corollæ affixa, segmentis opposita, filamentis brevibus 1 mm. longis, antheris subulatis 4 mm. longis, apiculatis. Ovarium globosum 1 mm. longum apice in stylum filiformem 4 mm. longum attenuatum. Fructus globosus, 8 mm. in

diametro apiculatus, glaber, leviter minute tuberculatus, endocarpio membranaceo. Semina globosa 6 mm. in diametro.

Hab. Shintiku : Goshizan, leg. T. Kawakami et U. Mori Juni. 1906, (No. 1435) ; Kusshaku, leg. S. Nagasawa, 1905, (No. 358) ; Taitō ; Murimurisha, leg. K. Miyake, Dec. 1899.

Very near *A. crenata* Sims., but differs from it by the much broader leaves.

Ardisia remotiserrata Hayata sp. nov. Frutex, ramis glabris, cortice cinerascente, lenticellis minutis dispersis, ramulis divaricatis gracilibus. Folia alterna breve petiolata obovata, 7½ cm. longa, 3 cm. lata, apice abrupte acuta, basi attenuata, utraque glabra punctata, costis supra impressis, subtus elevatis, venis utraque pagine leviter elevatis, margine remote serrata, serris acutis, venis primariis utrinque latere 5, a costa angulo 50° egressis, rectis apice furcatis, ramis ad apicem serrarum attingentibus, petiolis 4 mm. longis. Flores cymosi, sessiles, ad apicem ramulorum terminales. Fructus globosus 7 mm. in diametro.

Hab. Garanbi, leg. T. Kawakami et G. Nakahara, Dec. 1906, (No. 854).

Near *A. morrisonensis* Hayata from which the present plant is easily distinguishable by its very remotely serrate leaves.

Ardisia simplicicaulis Hayata sp. nov. Caulis simplex, suffrutescens, fusco-purpurascens, longitudinaliter rugulosus, 30 cm. altus. Folia ad apicem caulis approximate alternatim disposita, chartaceo-membranacea lanceolato-angustata, 13 cm. longa, 18 mm. lata, apice acuminata basi obtusa vel breve attenuata, margine subintegra, vel mucronibus minutis obtusis remote instructa, utrinque glabra, costis et venis subtus tenuiter distinctis, venulis inconspicuis,

subtus pallidiora, minute punctata, petiolis 6 mm. longis supra subsulcatis. Flores prope apicem caulis hypohylli, 5-6 umbellati, umbellis cernuis longe pedunculatis, pedunculis gracilibus 3 cm. longis, pedicellis 1 cm. longis, apice leviter incrassatis. Fructus late globosi, 6 mm. in diametro, brevissime apiculati rubri, 1-spermi, endocarpiis membranaceis. Semina late globosa 5 mm. in diametro, albuminibus corneis, embryo minutus prope miropylum verticaliter situs, 2 mm. longus, plus minus complanatus, cotyledonibus a dorso complanatis.

HAB. Shinkō : Tannaisan, leg. T. KAWAKAMI et U. MORI, 1907, Mart. (No. 2700) ; Shichiseitonzan, leg. B. HAYATA, Aug. 1900.

Near *A. hortorum* MAXIM. ; but differs from it in having much narrower leaves.

Sapotaceæ.

Palaquium BLANCO.

Palaquium formosanum HAYATA n. sp.

Palaquium ellipticum HAYATA in MATSUM. et HAYATA Enum. Pl. Formos. p. 227, (non ENGL.).

Rami validiusculi cortice subglabro cinerascente vestiti, cicatricibus foliorum magnis reniformibus notati. Folia breve petiolata elliptica, 11 cm. longa, 5 cm. lata, apice retundata vel emarginata basi rotundata, vel plus minus cordata, supra glabra, subtus pilis minutis adpresse parce dispersa, supra costis et venis impressis, subtus costis prominentibus, venis primariis haud conspicuis, utrinque latere 7, a costa angulo 60° egressis, rectis prope marginem subito curvatis anastomosantibus, petiolis 5 mm. longis. Flores perfecti non visi.

Hab. Sharyōtō, leg. T. Makino, Nov. 1896.

Differs from *P. ellipticum* Engl. in having very obtuse or even emarginate leaves with a rounded or cordate base.

Palaquium polyandrum Hayata sp. nov. Rami validiusculi cinerascentes, glabri, cicatricibus foliorum orbicularibus notati. Folia alterna petiolata, obovata, 12 cm. longa, 7-8 cm. lata, apice truncato-rotundata, basi rotundata, margine integra leviter recurvata, costis et venis supra impressis, subtus costis prominentibus venis leviter elevatis, venis primariis utrinque latere 7, rectis, a costa angulo 50° egressis, rectis, prope marginem anastomosantibus, venulis inconspicuis petiolis 5 mm. longis. Flores axillares 3-4-fasciculati longe pedicellati, pedicellis 13 mm. longis. Calyx 6-partitus, segmentis imbricatis, rotundatis, 5 mm. longis, crassiusculis. Corollæ tubus 3 mm. longus totiusque latus, limbus 6-lobatus, lobis contortis lanceolatis, obtusis 1 cm. longis, 3 mm. latis. Stamina 20-25, basin corollæ affixa, inæqualia circ. 1-½ cm. longa, filamentis filiformibus basin plus minus connatis, antheris 3½ mm. longis, 1 mm. latis apice obtusis basi saggitatis extrorsum dehiscentibus. Ovarium conicum 2 mm. longum, apice attenuatum in stylum abeuns, stylo recto 1 cm. longo basi incrassato. Bacca oblonga, 3½ cm. longa, 3 cm. lata, calycis lobis persistentibus, rotundatis 5 mm. longis, pedicellis 3 cm. longis.

Hab. Kōtōshō, leg. T. Kawakami et G. Nakahara.

Near *P. obovatum* Clarke, (Hook f. Fl. Brit. Ind. III. p. 542) from which the present plant is distinguishable by not protruding connectives and number of stamens which are usually more than twenty.

Ebenaceæ.

Maba Forst.

Maba buxifolia Pers. ; Wight Ic. Pl. Ind. Or. t. 763 ; A. DC. Prodr. VIII. p. 240 ; Clarke, in Hook. f. Fl. Brit. Ind. III. p. 551.

Hab. Kōtōshō, leg. T. Kawakami et G. Nakahara.

Distrib. Tropical Africa, Malay archipelago, India, N. Australia, Philippines, and Loo-choo islands.

Diospyros Linn.

Diospyros Kusanoi Hayata sp. nov. Rami cinerascentes, glabri. Folia coriacea, obovata vel obovato-oblonga, 7½ cm. longa, 4 cm. lata, apice rotundata, vel rotundato emarginata, basi obtusa ad petiolum brevem 6 mm. longum attenuata, margine integra, costis supra impressis, subtus prominentibus, venis primariis lateralibus tenuissimis supra planis subtus leviter elevatis, utrinque pallidissima. Fructus globosus, 3 cm. in diametro, basi calycibus persistentibus suffulti, calycis lobis 4, incrassatis, triangularibus 8 mm. longis 9 mm. latis, apice reflexis, obtusis, extus glabris rugulosis, intus villoso-tomentosis. Semina oblique-oblonga, a latere compressa, facie acuta, dorso rotundata, 12 mm. longa.

Hab. Kuraru, leg. N. Konishi ; et leg. S. Kusano, 1909.

Diospyros Oldhami Maxim. var. **chartacea** Hayata n. n. Rami fusco rubescentes, glabri. Folia alterna chartaceo-coriacea petiolata, oblonga, 9½ cm. longa, 3½ cm. lata, apice abrupte acuta, basi gradatim acuta, margine subintegra, utrinque glabra, supra venis

venulisque impressis, subtus leviter elevatis, venis primariis utrinque latere 4-5, a costa angulo 20° egressis, prope marginem anastomosantibus, venulis reticulatis, petiolis 1½ cm. longis. Fructus globosus 3 cm. in diametro.

Hab. Nantō: Musha, leg. T. Kawakami et U. Mori, Aug. 1906, (No. 1181).

Styraceæ.

Symplocos Linn.

Symplocos arisanensis Hayata sp. nov. Rami fusco-purpurascentes, hirsuto-pubescentes, demum subglabrati, cicatricibus foliorum notati, longitudinaliter profundeque rugosi, ramulis gracilibus ferrugineo-hirsutis, vel subglabratis. Folia oblonga, vel oblongo-lanceolata, 7½ cm. longa, 26 mm. lata, apice cuspidato-acuminata, basi obtusa, cuneato-obtusa, margine tenuiter obscureque crenulato-serrulata, crenis obtusis brevissimis, basin subintegra, costis et venis supra planis, subtus leviter elevatis, venis tenuissimis, chartacea, supra ad costas prope basin parce hirsuta, cæterum subnitida, subtus pallidiora, petiolis brevibus 2 mm. longis parce hirsutis. Racemi pubescentes ad axillas foliorum superiorum solitarii, 5 cm. longi, a basi usque ad apicem floriferi, simplices, pedicellis brevissimis, vel floribus sessilibus, bracteis rotundatis, margine ciliolatis 2 mm. longis, 2½ mm. latis, bracteolis 2, triangularibus acutis ciliolatis, 1-costatis. Calycis tubus brevis, lobis rotundatis imbricatis 2 mm. longis, 1½ mm. latis, extus subglabratis vel tenuissime pubescentibus. Corolla campanulata, 5 mm. longa, circ. 5-partita, segmentis basi leviter connatis rotundatis, valde concavis 5 mm. longis, 4½ mm. latis, integris. Stamina circ. 25,

basin corollæ affixa, extimis longissimis 10 mm. longis, antheris globosis $\frac{2}{3}$ mm. longis utrinque profunde 2-lobatis, intimis brevissimis. Stylus columnaris, 4 mm. longus, leviter recurvus, apice capitatus.

Hab. Arizan, leg. T. Kawakami et U. Mori 1908, Mart. (No. 3710).

The present plant comes near *S. prunifolia* S. et Z. and *S. Candolleana* Brand; but differs from the former in having larger calyx and subsessile leaves, and from the latter, by the very short petioles and longer corolla. Also near *S. grandiflora* Wall. and *S. formosana* Brand, but is distinguishable from the former by the smaller leaves and pubescent inflorescence, and from the latter, by the much larger flowers.

Symplocos formosana A. Brand in Engl. Pfl.-reich IV.-242, Symplocaceæ, p. 67.

Distrib. An endemic plant.

Symplocos japonica A. DC. Prodr. VIII. p. 255; Franch. et Savat. Enum. Pl. Jap. I. p. 307; Forbes et Hemsl. Ind. Fl. Sin. II. p. 73.

Hab. Tōyen: Nankakuzan, leg. T. Kawakami et U. Mori 1908, Mart. (No. 2658).

Distrib. Hupeh, Szechuen; Loo-choo islands and Japan.

Symplocos prunifolia S. et Z. Fl. Jap. Fam. Nat. II. p. 9; Miq. in Ann. Mus. Bot. Lugd.-Bat. III. p. 101; Franch. et Savat. Enum. Pl. Jap. I. p. 308; Forbes et Hemsl. Ind. Fl. Sin. II. p. 74.

Hab. Tōyen: Ukuzan, leg. T. Kawakami et U. Mori, 1908 Mart. (No. 2678).

DISTRIB. Eastern India, Japan and China.

Alniphyllum MATSUMURA.

Alniphyllum Fauriei PERKINS in ENGL. Pfl.-reich IV.-241, Styracaceæ, p. 93.

DISTRIB. An endemic plant.

Oleaceæ.

Fraxinus LINN.

Fraxinus formosana HAYATA sp. nov. Rami fusco-rubescentes, lenticellis orbicularibus obtecti, ramulis novellis rubescentibus pubescentibus. Folia opposita, petiolata, pinnata utrinque glabra, foliolis 5 petiolulatis oppositis, foliolo terminali longissimo lanceolato 5 cm. longo 17 mm. lato utrinque attenuato ad summum obtuso, petiolulo 2 cm. longis, lateralibus brevioribus ovatis utrinque attenuatis, petiolulis 3 mm. longis, venis primariis inconspicuis, petiolis 2 cm. longis. Paniculæ terminales, ramis divaricatis gracilibus, floribundis, bracteis et bracteolis parvis lanceolatis obtusis, pedicellis 3 mm. longis. Calyx campanulatus, circ. 1 mm. longus, truncatus, lobis obsoletis. Corolla profunde 4-lobata, lobis angustatis $2\frac{2}{3}$ mm. longis, $\frac{2}{3}$ mm. latis, erectis, apice obtusis. Stamina 2, basin corollæ affixa, 3 mm. longa, antheris oblongis, 2 mm. longis apiculatis, basi sagittatis. Ovarium ovatum apice attenuatum, stylo lineari 2 mm. longo, stigmate 2-fido.

HAB. Kōshūn: Maripa, leg. G. NAKAHARA, Feb. 1907.

Near *F. bracteata* HEMSL., but differs from it in having smaller flowers and very much smaller bracts which in the other species are very much larger and conspicuous. From *F. ferruginea* this is

distinguishable by the much smaller flowers and less hairy inflorescence ; from *F. Griffithii* CLARKE, by the ovate leaves which are less attenuate at the apex ; from *F. philippinensis* MERR., by the ovate leaves which are less acuminate at the apex and quite obtuse at the point.

Fraxinus minute-punctata HAYATA sp. nov.

Fraxinus floribunda WALL. var. *integerrima* MATSUM. in Tōkyō Bot. Mag. XII. p. 14 (non WEZIG). Ramuli cenerascentes, lenticellis minutis nototi, augulati. Folia pinnata cum petiolis 20 cm. longa, 9 cm. lata, ambitu obovata, membranaceo-chartacea, pinnis utraque latere 2-3 circ. 3 cm. a se remotis oppositis, infimis minimis, superioribus majoribus, pinna terminali magna, oblonga, vel elongata-oblonga, 8 cm. longa, 2½-5 cm. lata, apice cuspidato-obtuso-acuminata, vel acuta, basi acuta, margine integra, supra costis planis vel impressis, subtus elevatis, venis lateralibus utrinque tenuibus, supra minutissime lepidoto-punctata, subtus glabra, pallidiore, petiolulo 2½ cm. longo, supra sulcato, pinnis lateralibus oppositis minoribus, plus minus obliquis oblongo-ovatis, usque ad ovatis, infimis minimis pinnam terminalem ¼-plo in longitudine æquantibus, petiolulis brevioribus, petiolis 3 cm. longis, rhachis et petiolis supra sulcatis subglabris. Paniculæ terminales, ternatim ramosæ, 11 cm. longæ, totiusque latæ, ramis divaricatis, cinereo-pubescentibus, bracteis minutis 3 mm. longis oblongo-angustis, pedicellis tenuibus 3 mm. longis. Capsulæ samaroideæ, spathulatæ, 22 mm. longæ, 3½ mm. latæ apice rotundato-emarginatæ, basi cuneato-attenuatæ, minute lepidoto-pubescentes. Calyces fructiferi campanulati, ⅔ mm. longi, obscure 4-dentati.

HAB. Loo-choo islands.

Very near *F. bracteata* HEMSL., but differs from it in having

capsules which are very narrowly attenuate at the base and in having very small bracts. The capsules of *F. bracteata* are far less attenuate at the base, and the bracts are very much larger, and conspicuous.

Osmanthus Lour.

Osmanthus Aquifolium Benth. et Hook. Gen. Pl. II. p. 677; "Gard. Chron. n. s. VI. p. 689, f. 132"; Forbes et Hemsl. Ind. Fl. Sin. II. p. 87.

Olea Aquifolium Sieb. et Zucc. Fl. Jap. Fam. Nat. n. 562; Miq. in Ann. Mus. Bot. Lugd.-Bat. II. p. 264; Franch. et Sav. Enum. Pl. Jap. I. p. 312.

Ilex Aquifolium Thunb. Fl. Jap. p. 79, (non Linn.).

Hab. Sōtenzan, leg. N. Konishi, Aug. 1907, (No. 37).

Distrib. China and Japan.

Osmanthus integrifolius Hayata sp. nov.

Osmanthus sp. nov. Hayata Fl. Mont. Formos. p. 161.

Folia alterna oblonga 5 cm. longa, 2 cm. lata, apice aristato-acuta basi obtusa rigide coriacea supra (exsiccato) reticulato-rugosa subtus obscure venosa, petiolata, petiolis 1 cm. longis. Flores ad axillas foliorum circ. 10 fasciculati, fasciculis squamis 2-3 late ovatis minutis 1 mm. longis instructis, pedicellis 1 cm. longis. Calyx brevis 1 mm. longus, 4-lobatus, lobis late ovatis. Corolla late campanulata 4 mm. longa, tubo brevissimo, limbo 4 lobato, lobis late ovatis obtusis. Stamina 2 supra basin corollæ affixa, filamentis brevibus, antheris oblongis apiculatis. Ovarium conicum, stylo brevi, stigmate conico 2-lobo. Fructus ignoti.

Near *Osmanthus Cooperi* Hemsl., but differs from it by the

oblong or ovate leaves with a nearly rounded base, and a calloso-aristate apex.

HAB. in monte Morrison, ad 8000 ped. alt., leg. T. KAWAKAMI et U. MORI, Oct. 1906, (No. 2003).

Osmanthus lanceolatus HAYATA sp. nov.

Osmanthus sp. nov.? HAYATA Fl. Mont. Formos. p. 161.

Folia alterna, rigide coriacea, lanceolata, 10 cm. longa, 2½ cm. lata longe acuminata basi acuta petiolata, petiolis 1 cm. longis. Flores ad axillas foliorum circ. 20-fasciculati, fasciculis squamis 2-3 ovatis acutis coriaceis 5 mm. longis instructis, pedicellis 1 cm. longis. Calyx brevis late 4-lobus. Corolla subcampanulata 4 mm. longa 4 loba, lobis 2½ mm. longis late ovatis subclausis. Stamina 2 ad medium tubi corollæ affixa, antheris suborbicularibus, connectivis latis apiculatis. Ovarium conicum, stylo ovario longiore, stigmate peltato crasso 2-lobo. Fructus ignoti.

HAB. Tōzan, in montibus Morrison, leg. G. NAKAHARA, Oct. 1906.

Osmanthus Matsumuranus HAYATA sp. nov. *Osmanthus marginatus* MATSUM. in Tōkyō Bot. Mag. XII. p. 29; MATSUM. et HAYATA Enum. Pl. Formos. p. 247, (non BENTH. et HOOK.). Ramuli glabri, complanati, angulati, læves, fusco-purpurascentes, pulvinis plus minus elevatis. Folia chartacea, oblonga, oblanceolata, obovato-oblanceolata, vel elongato-oblonga, 12 cm. longa, 33 mm. lata, apice breve cuspidato-acuta, ad summum obtusa, basi cuneato-acuta, ima subito breve attenuata, margine subintegra, vel plus minus undulata, costis supra impressis, subtus prominentibus, venis primariis lateralibus tenuissime elevatis tenuissimis, utraque latere 12-15, recto-patentibus, prope marginem subito arcuatis, anastomosantibus, a costa angulo 60° divaricatis,

venulis inconspicuis, utraque pagine minute elevato-punctata, glabra, exsiccato pallido-fulvescentia subtus pallidiora, petiolis 13 mm. longis, subalatis supra subplanis plus minus sulcatis. Racemi novelli 13 mm. longi, floribus non satis notis. Ex descriptione Prof. J. MATSUMURÆ: "A typo differt foliis subito acuminatis. Cortex trunci griseus. Folia petiolata, oblonga, basi attenuata apice subito acuminata, integerrima, interdum versus apicem obscure paucidentata, glaberrima, costis utrinque 10-13, subpatentibus. Racemi novelli 13 mm. longi, ad basin bibracteati, villosi, bracteis oppositis, oblongis obtusis, carinatis, dorso subvillosis margine ciliolatis. Calyx 4-lobatus, lobis obtusissimis, ciliolatis. Corolla sp. nos. nondum explicata, non satis examinata, æstivatione imbricata. Folia subpatentia maxima 140 mm. longa, 35 mm. lata."

HAB. Linkiho, leg. S. HONDA.

The present plant comes near *Osmanthus marginatus* BENTH., but differs from it in having much thinner leaves, which are abruptly acuminate at the apex. As is pointed out by Prof. J. MATSUMURA in the paper above cited, the plant does not accord with BENTHAM's plant, especially in the shape of leaves. I have compared my plant with the type of the latter species at Kew, and found that they are quite different even in general appearance, though they come very near.

Apocynaceæ.

Melodinus FORST.

Melodinus angustifolius HAYATA sp. nov. Scandens, ramis gracilibus glabris flavo-cinerascentibus teretibus, lævibus, ramulis gracillissimis divaricatis. Folia opposita petiolata, lineari-lanceolata,

8 cm. longa, 1 cm. lata, apice attenuata obtusa basi acuta, margine subintegra, obscure undulata, utrinque glabra, supra fuscentia subtus pallidiora, venis primariis a costa angulo 60° egressis, rectis prope marginem anastomosantibus, venulis reticulatis utrinque elevatis, petiolis 5 mm. longis. Cymæ terminales, paucifloratæ, bracteatæ, bracteis et bracteolis late ovatis obtusis 1 mm. longis. Calyx 5-partitus, eglandulosus, segmentis triangularibus obtusis, $2\frac{1}{2}$ mm. longis, basi 2 mm. latis, crassiusculis coriaceis ciliolatis. Corolla hypocratherimorpha, tubo cylindrico 8 mm. longo, $1\frac{1}{2}$ mm. lato, ad insertionem staminum dilatato, fusco-hirsuto, limbo 5-lobato, lobis rotundatis 6 mm. longis basi oblique angustis, (ad basin 2-squamulatis, squamulis erectis 1 mm. longis), contortis sinistrorsum obtegentibus. Stamina 5, medio tubi inclusa, filamentis 1 mm. longis, antheris lanceolatis apice acutis basi cordatis. Discus 0. Ovarium conicum integrum 1 mm. longum, stylo breve $\frac{1}{2}$ mm. longo, stigmate incrassato $\frac{2}{3}$ mm. longo, apiculo $\frac{1}{2}$ mm. longo, 2-fido. Bacca oblongo-fusiformis, 5 cm. longa, $2\frac{1}{2}$ cm. lata, utrinque acuta, pulpa carnosa repleta. Semina ∞, pulpa nidulantia, ovata 8 mm. longa 5 mm. lata ; albumen carnosum ; cotyledones foliaceæ.

Hab. Kōshūn : Naibunsha, leg. G. Nakahara, Feb. 1907; ibidem, leg. T. Kawakami, Dec. 1906, (No. 840) ; Kurarusha, leg. T. Kawakami, Juli. 1906, (No. 1621) ; Taitō : Pashikō, leg. Z. Kobayashi, Juni. 1906, (No. 1552).

Near *M. suaveolens* Champ. ; but differs in having much narrower or even linear leaves and ellipsoidal fruit.

Ecdysanthera Hook. et Arn.

Ecdysanthera utilis Hayata et Kawakami in Tōkyō Bot.

Mag. XX. p. 51 ; Matsum. et Hayata Enum. Pl. Formos. p. 251.

This is very near *E. micrantha* A. DC., but differs from it by the leaves which are much narrower at the base, denser cymes, and terete and fusiformed follicles. This is also near *E. napeensis* Pierre, which is known as a rubber plant, but differs from it in having shorter corolla-lobes.

Anodendron A. DC.

Anodendron læve Maxim. in litt. ex Franch. et Savat. Enum. Pl. Jap. I. p. 315 ; Benth. et Hook. Gen. Pl. II. p. 717, sub *Ichnocarpo*, et p. 719 ; Forbes et Hemsl. Ind. Fl. Sin. II. p. 99.

Hab. Nagodake, leg. G. Nakahara, Aprili. 1907.

Distrib. Kwangtung, Hongkong, and Japan.

Asclepiadeæ.

The following species have been kindly examined by Mr. N. E. Brown, assistant keeper of the Herbarium at Kew. He has found several new species in my collections. As he is very much occupied with colonial floras which at present monopolize nearly all the staff of the Herbarium, he has urged me to describe the new species in the present paper.

Tylophora Br.

Tylophora Browni Hayata sp. nov. Scandens, ramis gracilibus teretibus, pubescentibus demum glabratis, longitudinaliter rugosis rugulis prominentibus, pulvinis plus minus elevatis, ramulis tetragonis reflexo-pilosis. Folia oblongo-ovata, vel late ovata generaliter 8 cm. longa, 4 cm. lata, apice obtusa vel rotundata brevissime

mucronata, vel cuspidata, chartacea, basi cordata vel rotundata, margine integerrima, angustissime reflexa, utraque glabra vel parcissime hirsuta, exsiccato supra nigro-fuscentia, subtus pallidissima, costis et venis utrinque tenuibus, petiolis 1-2 cm. longis. Cymæ axillares, longe pedunculatæ, pedunculis gracilibus 2 cm. longis simplicibus, vel pauci-ramosis, ramis divaricatis, floribus 20-30 ad apicem pedunculorum umbellatim dispositis, basi pedicellorum 1-bracteatis, bracteis acuminatis 1 mm. longis, pedicellis gracillimis, patentibus glabris, basi articulatis. Calyx campanulatus, 5-fidus, laciniis acuminato-triangularibus, glabris 1 mm. longis. Corolla patens extus glabra, 5-fida, laciniis oblongo-ovatis $4\frac{1}{2}$ mm. longis, 2 mm. latis, apice acuminato-reflexis, vel obtusis, extus glabris, intus deorsum glabris sursum longe barbatis. Columna $\frac{3}{4}$ mm. longa.

Hab. Kōshūn : Kururusha, leg. T. Kawakami, Juli. 1905, (No. 1648).

The present plant is named in honour of Mr. N. E. Brown, who has kindly examined this plant at my request.

Tylophora hispida Decne. var. **Browni** Hayata n. v. Scandens, caulibus gracilibus teretibus, pallidioribus, pubescentibus, pilis reflexis. Folia opposita, membranaceo-chartacea, pallida, oblongo-ovata, 4 $\frac{1}{2}$ cm. longa, 6 cm. lata, apice brevissime cuspidato-mucronata, basi rotundata, vel rotundato-cordata, vel truncata, integra, ciliolata, supra primum brevissime pubescentia, demum glabrata, vel parcissime pubescentia, subtus dense brevissime villoso-pubescentia ad costas et venas subtus fusco-tomentosa, pinninervia, vel basi obscure 3-nervia, costis et venis utrinque tenuissimis, petiolis 1 cm. longis tomentosis. Cymæ axillares pedunculatæ, simplices, vel pauci-ramosæ, pedunculis 1-2 cm. longis pubescentibus, floribus 20-30 ad apicem pedunculorum umbellatim dispositis,

longe pedicellatis, pedicellis glabris gracillimis, 1 cm. longis, bracteis ad basin pedicellorum 1, lanceolatis, 1 mm. longis, barbatis, pedicellis ad basin articulatis, cicatricibus pedicellorum cupuliformibus. Flores patentes, 7 mm. in diametro. Calyx campanulatus, patens, extus parcissime barbatus, 5-fidus, laciniis acuminatis, triangularibus $1\frac{1}{4}$ mm. longis, inter lacinias glanduliferis, glandulis triangularibus minutis. Corolla subrotato-patens, 5-fida, laciniis acuminato-ovatis, 3 mm. longis, $1\frac{2}{3}$ mm. latis, apice obtusis, obscure 7-nerviis. Columna $\frac{2}{3}$ mm. longa. Folliculls ovato-fusiformis apice attenuatus, 4-6 cm. longus, horizontaliter divaricatus. Semina ovata, complanata, $4\frac{1}{2}$ mm. longa, apice obtusa, basi retundata. Coma alba 1 cm. longa.

Hab. Taitō: Maraoo, leg. T. Kawakami et Z. Kobayashi, 1908, Aug. (Nos. 5025, 5603 et 5700); Shintiku, leg. Y. Shimada, (No. 5700).

The flowers of this are nearly twice as larger as those of Decaisne's type, but scarcely larger than some of the Hongkong specimens. The pedicels also are glabrous or with only a few hairs, whilst in the type they are covered with hairs. These specimens here given, are identical with Oldham, 326 and Henry, 1162, B, both from Formosa. ——N. E. Brown, May, 13, 1910.

Tylophora japonica Miq. (det. N. E. Brown).

Hab. Kumejima, leg. H. Kuruiwa.

Tylophora Oshimæ Hayata sp. nov. Herba tenuissima scandens, caulis gracillimus, teres, 1 mm. in sectione, facie dorso et ventrale glaber, utraque latere pubescens, striatus, cinereo-viridis, foliatus, internodiis 4 cm. longis. Folia opposita, breve petiolata, angustissime linearia, 6 cm. longa, 3 mm. lata, apice acuta, basi obtusa, margine integerrima, revoluto-reflexa, prope apicem basin-

que paucissime ciliolata, supra ad costas impressas hirsuta, subtus costis prominentibus paucissime hirsutis, vel glabris, utraque pagine glabra, venis et venulis utraque pagine longitudinaliter impresso-reticulatis, exsiccato supra pallido-viridia, subtus albo-pallidissima, ad insertionem petiolorum abrupte reflexo-inclinata, petiolis 5 mm. longis, supra plani svel subsulcatis hirsutis, subtus glabris. Cymæ paucifloratæ, floribus 2-3, axillares, solitariæ longe pedunculatæ, pedunculis gracilibus, 2-3 cm. longis, floribus pedicellatis, pedicellis glabris, 4 mm. longis, bracteis acuminatis obtusis, extus hirsutis. Flores patentes, 8 mm. in diametro. Calyx patens, 5-fidus, segmentis triangulari-ovatis, acutis, margine ciliolatis, $\frac{2}{3}$ mm. longis, inter segmenta glanduliferis, glandulis punctiformibus. Corolla patens subrotata, 5-fida, segmentis elongato-ovato-triangularibus apice obtusis, 3 mm. longis, $1\frac{1}{2}$ mm. latis, extus glabris, intus brevissime pubescentibus. Corollæ squamæ 5, carnosæ, tubo staminali connatæ. Stamina tubo corollæ affixa, filamentis in tubum $\frac{1}{2}$ mm. longum connatis, antheris erectis $\frac{1}{2}$ mm. longis, membrana inflexa terminatis. Pollinia in quoque loculo solitaria, parva, globosa, caudiculis horizontalibus affixa. Stigma medio vertice umbonatum.

Hab. Taitō : Sumegan, ad 9000 ped. alt., leg. T. Kawakami et U. Mori, Jan. 1908, (No. 4551).

The present plant is distinct from any species of the genus known to us. The nearest congener is *T. tenerrima* Wight which is however perfectly distinct from our plant. It is named in honour of Mr. K. Oshima, Ex-Civil Governor of Formosa, by whose graciousness extended towards myself, I was able to visit the principal herbaria of the West.

Tylophora stenoloba Warb. in Fedde Rep. III. (1907) p. 339.

Hab. Loo-choo islands.

Near *T. Tanakæ* Maxim.

Cynanchum Linn.

Cynanchum liukiuense Warb. in Fedde Rep. III. (1907), p. 304.

Hab. Loo-choo (Warburg).

Near *C. formosanum* Maxim.

Gymnema Br.

Gymnema formosanum Warb. in Fedde Rep. III. (1907) p. 307.

Hab. Formosa : South Cape, (Warburg).

Marsdenia Br.

Marsdenia tomentosa Morr. et Decne. (det. N. E. Brown.)

Hab. Oshima : leg. T. Uchiyama, Dec. 1900.

Heterostemma W. et Arn.

Heterostemma Browni Hayata sp. nov. Scandens, caulibus gracilibus lævibus, glabris teretibus tortuosis, remote foliatis. Folia ovata, vel oblongo-ovata, majuscula, 10 cm. longa, 5½ cm. lata, apice cuspidata vel cuspidato-acuta, basi rotundata, vel cordata,basi laminæ ad insertionem petiolorum supra multiglandulosa, glandulis minutis circ. 10-aggregatis, margine integra leviter angustissime marginato-reflexa, supra parcissime hispidula vel glabra, subtus glabra,

supra viridia, subtus pallidissima, basi 5-nervia, nervis centralibus lateralibusque conspicuis, basilaribus tenuissimis, chartacea, petiolis 3 cm. longis supra leviter sulcatis glabris. Cymæ axillares, pedunculatæ, pedunculis simplicibus 2-3 cm. longis, glabris, floribus ad apicem pedunculorum umbellatim 10-20-dispositis, longe pedicellatis, pedicellis gracilibus, $1\frac{1}{2}$ cm. longis, patentissimis, basi articulatis, 1-bracteatis, bracteis late ovatis $\frac{1}{2}$-1 mm. longis, obtusis. Flores patentes circ. 1 cm. in diametro. Calyx 5-partitus, segmentis ovatis obtusis $1\frac{1}{2}$ mm longis, medio dorso crassiusculis, margine hyalinis tenuibus minute denticulatis, inter segmenta glanduliferis, glandulis minutis, triangularibus $\frac{1}{5}$ mm. longis. Corolla patens campanulata, 1 cm. in diametro, 5-lobata, lobis late ovato-triangularibus 3 mm. longis, 3 mm. latis, obtuso-acuminatis, utrinque glabris, sursum margine reflexis, apice leviter recurvatis. Corollæ squamæ acuto-acuminatæ, 2 mm. longæ, $\frac{2}{3}$ mm. latæ, patentes, liberæ.

Hab. Shintiku : Taitōga, leg. T. Kawakami et U. Mori, Juni. 1905, (No. 1373) ; Taiko, leg. B. Hayata et U. Mori, Aug. 1908, (No. 41).

[I believe all these (specimens given above) belong to one species which I regard as a new species of *Heterostemma*. It is not represented at Kew.——N. E. Brown May, 13, 1910].

Gentianaceæ.

Erythræa Rich.

Erythræa australis R. Brown.

Hab. Oshima, leg. Tashiro, Nov. 1887, (Fl.)

Compared with a specimen of the species at Kew.

Crawfurdia Wall.

Crawfurdia lanceolata Hayata sp. nov. Herba scandens glabra, gracillima, 1 mm. in sectione, internodiis 5 cm. longis. Folia opposita, petiolata, lanceolata, 5½ cm. longa, 7 mm. lata trinervia, apice acuminata, basi rotundato-acuta, integra, petiolis 1 cm. longis. Flores axillares vel terminales, pedunculis 1 cm. longis foliolis bracteæformibus parvis instructis. Calyx campanulatus, tubo 1 cm. longo, 5-costato, limbo 5-dentato, dentibus linearibus 8 mm. longis 1 mm. latis. Corolla tubuloso-campanulata, 3 cm. longa apice dilatata, 5-lobata, lobis brevibus triangularibus 4½ mm. longis 3½ mm. latis, acutis basi obliquis, sinibus plicatis, obliquis dentatis. Discus annularis, 2 mm. longus 5-lobatus. Ovarium stipitatum, stipite 9 mm. longo, lanceolatum complanatum 10 mm. longum 2-costatum, stylo filiformi 12 mm. longo apice 2-lamellato.

Hab. Randaizan, leg. B. Hayata et U. Mori, Aug. 1908.

Near *C. Pterygocalyx* Hemsl. from which this differs in having narrower and thicker leaves, much shorter pedicels, minute bracts at the base of the flowers, much longer calyx-lobes, not winged calyx, and larger flowers.

Gentiana Linn.

Gentiana cæspitosa Hayata Fl. Mont. Formos. p. 165.

Near *G. pulla* Franch., but differs from it in having much larger flowers.

Gentiana parvifolia Hayata sp. nov. Herba gracillima, glaberrima, procumbens ad nodos radicans, caulibus prostratis, gra-

cillimis $\frac{2}{3}$ mm. in sectione, internodiis 4 cm. longis. Folia opposita petiolata ovata cum petiolis $1\frac{1}{2}$ cm. longa 7 mm. lata, apice aristato-acuta basi abrupte attenuata in petiolum 5 mm. longum abeuntia, margine integra vel sub lente denticulata ablo-lamellata, utrinque glabra, 1-3-nervia, subtus pallidiora. Flores axillares vel terminales, erecti pedunculati, pedunculis 7 mm. longis, bracteis oppositis lanceolatis 1 cm. longis. Calyx campanulatus membranaceus 12 mm. longus, tubo campanulato 7 mm. longo 5 mm. lato, 5-costato, limbo 5-dentato, sinibus inter dentes latis truncatis, dentibus 5 mm. longis $\frac{2}{3}$ mm. latis, linearibus dorso carinatis acuminatis. Corolla tubuloso-campanulata, $2\frac{1}{2}$ cm. longa, tubo superne dilatato, limbo 5-lobato, lobis brevibus triangularibus, 4 mm. longis $4\frac{1}{2}$ mm. latis acutis, contortis, sinibus plicatis denticulatis subtruncatis. Stamina 5, ad basin tubi affixa, filamentis filiformibus 22 mm. longis complanatis basi dilatatis, antheris ovatis, sagittatis, versatilibus. Discus annularis $\frac{1}{2}$ mm. longus obscure 5-lobus vel lobis obsoletis. Ovarium angustatum vel lanceolatum complanatum 12 mm. longum 3 mm. latum, stylo 17 mm. longo, filiforme apice 2-fido, ramis 5 mm. longis filiformibus turbulenter recurvatis, stipite 2 mm. longo.

Hab. Randaizan, leg. B. Hayata et U. Mori, Aug. 1908, (No. 7117).

Near *Gentiana filicaulis* Hemsl., but differs from it in having longer corolla with broader lobes, and much smaller leaves. Remarkable for the small leaves which are nearly ovate with acute apex and narrowed base attenuated to the petioles.

Gentiana scabrida Hayata Fl. Mont. Formos. p. 168.

Near *G. Piasezkii* Maxim. but differs from it in having much shorter calyx.

Swertia Linn.

Swertia arisanensis Hayata n. n.

Swertia alata Hayata Fl. Mont. Formos. p. 168, (non Royle.).

As the name *Swertia alata* had been used for a Himalayan plant, another name *S. arisanensis* is very desirable for the one from Formosa.

Swertia randaiensis Hayata sp. nov. Herba altiora, caulibus glabris tetragonis subalatis, (alis angustissimis 1 mm. latis,) flabescentibus ramosis, ramis oppositis gracilibus, divaricatis. Folia opposita, sessilia, 7-nervia lanceolata, 37 mm. longa, 6 mm. lata, apice acuminata utraque pagine glabra. Flores racemoso-paniculati, vel racemosi, racemis axillaribus vel terminalibus, foliatis, pedicellatis, pedicellis 1 cm. longis, bracteis lanceolato-ovatis 8 mm. longis. Calyx 5-partitus, segmentis lanceolatis acutis 4 mm. longis 1 mm. latis, 1-nerviis. Corolla rotata $4\frac{1}{2}$ mm. longa, tubo $\frac{1}{2}$ mm. longo, limbo 5-lobato, lobis oblongis acuminatis $4\frac{1}{2}$ mm. longis 2 mm. latis, 5-nerviis, prope basin glanduloso-maculatis, maculis 2, margine macularum longe ciliolatis, fauce tubi pilis brevibus, pagine loborum intus sub microscopio minute glanduloso-punctatis, dextrorsum obtegentibus. Stamina 5, fauce tubi corollæ affixa, filamentis $2\frac{1}{4}$ mm. longis campanulatis, antheris $\frac{2}{3}$ mm. longis ovatis apiculatis. Ovarium sessile, oblongo-ovatum, 3 mm. longum, $1\frac{1}{2}$ mm. latum, acuminatum, stigmate sessili, 2-fido, capituliformi.

Hab. Randaizan, leg. B. Hayata et U. Mori, Aug. 1908, (No. 7114); Ganzan, in montibus Morrison, ad 9141 ped. alt., leg. S. Nagasawa, Oct. 1905, (No. 642).

Near *Swertia purpurascens* WALL., but greatly differs from it in having erect corolla and shorter carpels. Also near *S. tetragona* EDGW., from which this is distinguishable by the much broader lobes of the calyx.

Swertia tozanensis HAYATA sp. nov. Herba erecta, gracillima, 20 cm. alta, caulibus glabris tetragonis leviter alatis, vel non alatis, 4-striatis. Folia opposita, petiolata, vel subsessilia, lanceolato-oblonga cum petiolis 3 cm. longa, 7 mm. lata, apice obtusa basi attenuata ad petiolum 7 mm. longum abeuntia, 3-nervia, venulis reticulatis. Flores axillares solitarii vel racemosi, racemis paucifloratis, pedicellis 2 cm. longis. Calyx 3-4 partitus, segmentis lanceolatis obtusis $1\frac{1}{2}$ mm. longis, apice reflexis. Corolla rotata 6 mm. longa, tubo breve 1 mm. longo, limbo 4-lobato, lobis oblongis $5\frac{1}{2}$ mm. longis, $2\frac{1}{2}$ mm. latis apice obtusis, prope marginem medio 2-maculatis, fauce glabro. Stamina 4, fauce tubi affixa, filamentis $1\frac{2}{3}$ mm. longis complanatis apice extrorsum reversis, antheris globosis $\frac{2}{3}$ mm. longis obtusis. Ovarium lanceolatum $4\frac{1}{2}$ mm. longum, $1\frac{1}{2}$ mm. latum apice obtusum, stigmate 2-fido, sessili. Capsula elongato-ovoidea, 11 mm. longa, 4 mm. lata, apice attenuata, valvis 2, apice leviter recurvatis. Semina globosa compressiuscula $\frac{2}{3}$ mm. in diametro.

HAB. Tōzan, in montibus Morrison, leg. G. NAKAHARA, Nov. 1906.

Limnanthemum GRISEB.

Limnanthemum cristatum GRISEB. in DC. Prodr. IX. p. 139 ; HANCE in Journ. Bot. (1878), p. 229 ; HOOK. f. Fl. Brit. Ind. IV. p. 131 ; FORBES et HEMSL. Ind. Fl. Sin. II. p. 142.

Hab. Tainan, leg. T. Kawakami et G. Nakahara, Feb. 1906, (No. 1073); in orizetis Suihenkiaku, leg. U. Faurie, Juni. 1903.

Distrib. China: Kwangtung, Fokien. India, Malay and the Philippines.

Boragineæ.

Bothriospermum Bunge.

Bothriospermum tenellum Fisch. et Mey. var. **majusculum** Hayata n. n. Herba strigosa 20-30 cm. alta, caulibus pilis strigosis patentibus rectis obtectis. Folia radicalia obovato-spathulata, 7 cm. longa, 23 mm. lata, apice apiculata, basi longe attenuata, margine irregulariter denticulata, vel subintegra, supra pilis strigosis rectis longis parce dispersa, et pilis brevioribus mollis pubescentia, subtus pilis mollis pubescentia; folia caulina obovato-oblonga 5 cm. longa, 17 mm. lata, apice acuta, basi breve attenuata. Racemi pauce remoteque florati, (floribus ad axillas bractearum solitariis, cernuis), pauce ramosi, ramis divaricatis. Calyx 5-partitus, segmentis oblongis 4 mm. longis, 1½ mm. latis, utraque facie longe strigosis. Corolla campanulata, 6 mm. longa, 5-lobata, tubo 3 mm. longo fauce squamis truncatis reflexis instructo, lobis oblongo-rotundatis, 3 mm. longis. Stamina 5, medio tubi affixa, filamentis brevibus vel subsessilibus, antheris oblongis 1 mm. longis. Ovarium depresso-globosum 1 mm. longum, stylo validiusculo 1 mm. longo.

Hab. Kelung, leg. S. Nagasawa, Mai. 1908, (No. 375).

The present variety differs from the type in having much larger flowers and fruit.

Convolvulaceæ.

Ipomœa Linn.

Ipomæa carnosa R. Br. ; Benth. Fl. Austral. IV. p. 420 ; Hook. f. Fl. Brit. Ind. IV. p. 213 ; Forbes et Hemsl. Ind. Fl. Sin. II. p. 158 ; Matsum. et Hayata Enum. Pl. Formos. p. 261.

Hab. Kōshūn : Garanbi, leg. T. Kawakami, 1905, Juni. (No. 5804).

Ipomæa denticulata Chois. in DC. Prodr. IX. p. 379 ; Clarke in Hook. f. Fl. Brit. Ind. IV. p. 208.

Hab. Kōtōshō, leg. T. Kawakami et U. Mori, 1907, Aprili. (Nos. 2485 et 2909).

Distrib. India, Malay, Australia, Polynesia and Seychelles.

Ipomæa linifolia Blume ; Clarke in Hook. f. Fl. Brit. Ind. IV. p. 205.

Hab. Daikwaikei, leg. T. Kawakami et Inoui, Sept. 1908.

Distrib. India, Malay archipelago, Australia.

Ipomæa quinata Br. ; Chois. in DC. Prodr. IX. p. 385 ; Benth. Fl. Hongk. p. 237 ; Hook. f. Fl. Brit. Ind. IV. p. 214 ; Forbes et Hemsl. Ind. Fl. Sin. II. p. 162.

Hab. Kagi : Rokuryōshō, leg. T. Kawakami et U. Mori, Oct. 1906, (No. 1962) ; Tainan : Shōhabō, leg. G. Nakahara, Oct. 1905, (No. 623).

Distrib. Kwangtung, Hongkong, and Eastern India to Northern Australia.

Ipomæa rotundisepala Hayata sp. nov. Herba scandens,

glabra, caulibus obscure striatis teretibus. Folia alterna petiolata, late cordata, 7 cm. longa, 5 cm. lata, apice acuminata, basi rotundata, truncata, vel leviter cordata, integra, venis primariis divaricatis basilaribus a costa circ. angulo 90° egressis, venis secundariis ascendento-transversis, utrinque glabra, petiolis 2½ cm. longis. Cymæ axillares, pedunculatæ, pedunculis 1½ cm. longis, pedicellis 5 mm. longis, bracteis late ovatis 2¼ mm. longis, 2 mm. latis, apice rotundatis basi late truncatis. Calyx globoso-campanulatus 6 mm. longus, 5-partitus, segmentis imbricatis orbicularibus basi contractis 5 mm. in diametro. Corolla infundibulari-campanulata, 3½ cm. longa. Stamina 5, basi corollæ affixa, filamentis filiformibus 1 cm. longis, basi dilatatis intus barbatis. Discus annularis, 1 mm. altus. Ovarium conicum 1½ mm. longum, stylo 14 mm. longo, stigmate didyme 2-globoso.

Hab. in monte Morrison, leg. T. Kawakami et U. Mori, Nov. 1906, (No. 1915).

Near *I. polyantha* Miq., from which the present plant differs in having entirely glabrous leaves and longer flowers. Also near *I. staphylina* Rœm. et Sch. but differs by the larger flowers, and acuter leaves with different venation.

Solanaceæ.

Solanum Linn.

Solanum lysimachioides Wall.; Roxb. "Fl. Ind. II. p. 259"; Dunal in DC. Prodr. XIII.-1, p. 181; Forbes et Hemsl. Ind. Fl. Sin. II. p. 171.

Hab. Tappansha, leg. T. Kawakami et U. Mori, Oct. 1906, (No. 1737); Nantō: Rakurakusha, leg. G. Nakahara, Aug. 1905, (No. 466).

Distrib. North India, and China : Hupeh, Szechuen.

Observ. Herba puberula, gracilis, caulibus striatis pubescentibus procumbentibus ad nodos radicantibus, internodiis 5 cm. longis. Folia opposita, inæqualia, sæpe alterum majus, alterum minus interdum ad nullum reductum, longe petiolata, ovata 4½ cm. longa, 3 cm. lata, apice abrupte acuta, ad summum obtusa, basi acuta ima attenuata, basi valde obliqua, utraque pagine ad costas laxe pubescentia, petiolis 3 cm. longis. Flores axillares, solitarii, pedunculis gracillimis 3 cm. longis, apice subnutantibus. Calyx campanulatus, tubo campanulato, 3 mm. longo, 4½ mm. in diametro, 10-costato, apice truncato limbo 10-dentato, dentibus aristatis, 3 mm. longis, horizontaliter patentibus, latere compressis, ½ mm. latis. Corolla rotata, 8 mm. longa, tubo breve ½ mm. longo, limbo 5-lobato, lobis ovato-lanceolatis 7 mm. longis, 2½ mm. latis, induplicato-valvatis. Stamina 5, libera, filamentis brevibus 1 mm. longis, fauce tubi affixis, antheris oblongis, 3½ mm. longis, 1½ mm. latis, apice 2-poris. Ovarium ovatum 1½ mm. longum, stylo filiformi 7½ mm. longo, stigmate capitellato. Bacca globosa 8 mm. in diametro. Semina complanata, orbicularia, 2 mm. in diametro, testa crustacea minute annulariter reticulata. Embryo linearis turbulenter recurvatus.

Remarkable for its creeping habit, free stamens, and 10-toothed calyx.

Scrophularineæ.

Ellisiophyllum Maxim.

Ellisiophyllum pinnatum Makino ; Hayata Fl. Mont. Formos.

p. 170; A. Brand Ellisiophyllum, in Zwei kritischen Pflanzengattungen, p. 5.

For comment as to this being referred to Scrophularineæ, see p. 8, under Introduction.

Paulownia Sieb et Zucc.

Paulownia sp. nov.? Hayata in Bull. III. Congrès International de Botanique de Bruxelles, (1910), p. 41, Pl. XXIV.

Hab. Mt. Sōtenzan, B. Hayata, Aug. 1908.

The present *Paulownia* was pointed out to me by Mr. T. Kawakami in August, 1908, when I was botanizing on the mountain with the same gentleman. I found the plant in full foliage, but lacking flowers. The photograph given in the paper above cited was taken by myself on the spot. I may add that there exist three species spontaneous in continental China and another also spontaneous in the Island of Formosa. The Chinese species of *Paulownia* are *P. imperialis* Sieb. et Zucc. (which exists also in Japan where it is found only in cultivation), *P. Fortunei*, which is easily distinguised from the preceding species by its much elongated leaves, and finally *P. Fargesii* Franch.

Hemiphragma Wall.

Hemiphragma heterophylla Wall.; Benth. in DC. Prodr. X. p. 429; Hook. f. Fl. Brit. Ind. IV. p. 289; Forbes et Hemsl. Ind. Fl. Sin. II. p. 192.

**Logonia dentata* Hayata Fl. Mont. Formos. p. 162, Pl. XXVIII.

Distrib. North India, South China, the Philippines.

* For comment as to this being referred to this species, see p. 6, under Introduction.

Lentibularieæ.

Utricularia Linn.

Utricularia biflora Hayata sp. nov. Herba parva tenuissima 4 cm. longa. Folia radicalia linearia spathulata, 2 cm. longa, $\frac{5}{12}$ mm. lata. Scapi 4 cm. longi prope medium bracteis instructi, (bracteis ovatis 1 mm. longis), apice 1-2 flores gerentes, floribus pedicellatis, pedicellis 2 mm. longis, basi bracteolatis, bracteolis ovatis 1 mm. longis. Calyx profunde 2-lobatus, lobis inæqualibus, inferiore minore ovato obtuso 2 mm. longo, superiore majore ovato obtuso, $2\frac{1}{4}$ mm. longo simplice plicato. Corollæ profunde 2-labiatæ, lobis anterioribus horizontaliter patentibus, calcaratis, (calcari $2\frac{1}{4}$ mm. longo, medio $\frac{1}{2}$ mm. lato,) 3 mm. longis basi 1-concavo-foveolatis (foveola $\frac{3}{4}$ mm. longa pubescente) glabris valde convexis margine planis ; lobis posterioribus erectis $3\frac{1}{2}$ mm. longis, $1\frac{1}{2}$ mm. latis basi urceolato-concavis prope medium callosiusculis, apice reflexis. Stamina 2, antice basi corollæ affixa, 1 mm. longa. Ovarium globosum, cum stylo brevissimo 1 mm. longum, stigmate 5-laminato, laminis inæqualibus. Capsula 2-valvata, late oblonga, 2 mm. longa, $1\frac{1}{2}$ mm. lata, valvis 2, membranaceis, calycis lobis accrescentibus inclusa. Semina ovoidea longitidinaliter reticulata $\frac{1}{3}$ mm. longa utrinque obtusa.

Hab. Taiko, leg. T. Kawakami et U. Mori, 1908.

Near *U. bifida* Linn. from which the present plant is easily distinguishable by the much smaller flowers, which are usually in pairs at the apex of the scape. Also near *U. diantha* R. et S., but differs from it by the yellowish flowers and linear leaves with bladders.

Utricularia racemosa Wall. ex A. DC. Prodr. VIII. p. 21 ; Benth.

Fl. Hongk. p. 256 ; Hook. f. Fl. Brit. Ind. IV. p. 333 ; Forbes et Hemsl. Ind. Fl. Sin. II. p. 224.

Hab. Shizangan, leg. B. Hayata, Juli. 1908.

Distrib. India, Ceylon, Malaya, Cochinchina and China.

Gesneraceæ.

Titanotrichum Solered.

Titanotrichum Oldhami Solered. in Berichite der Deutsch. Bot. Gesellsch. V.-27, p. 400, (Sept. 1909).

Matsumuria Oldhami Hemsl. in Kew Bull. Dec. (1909) p. 361.

**Rehmannia Oldhami* Hemsl. Ann. Bot. IX. p. 154 ; Ind. Fl. Sin. II. p. 194 ; Henry List Pl. Formos. p. 88 ; Matsumura et Hayata Enum. Pl. Formos. p. 282 ; Hayata Fl. Mont. Formos. p. 174.

Distrib. An endemic genus.

Observ. Herb base shrubby, hirsute ; stem slender, simple, hirsute, scape-like, erect, with a few leaves a little above the base, with a few flowers a little below the middle, and with many deformed ones spicately arranged upwards. Leaves shortly petioled, approximately alternate, obliquely oblong acute at both ends, margin serrate towards the apex, intire near the base, strigose above, pubescent below. Segments of deformed flowers very small oblong acute, terete, fleshy, numerously clustered ; clusters alternate, or approximately superposed. Flowers a few, racemosely arranged a little below the middle of the stem, pediceled. Calyx 5-parted, segments lanceo-

* For comment as to this being referred to this species and family, see p. 5, under Introduction.

late. Corolla tubuloso-campanulate, tube constricted a little above the base, base gibbose, limb patent, 2-lipped, upper lip 2-lobed, lower lip 3-lobed. Ovary hirsute, ovate, perfectly 1-celled, with two parietal placentas. Capsule ovate loculicidally dehiscent, valves afterwards again 2-parted, lignified. Seeds very minute winged.

Titanotrichum Oldhami Solered.—a, clusters of deformed flowers; b, a flower; c, a corolla expanded; d, an ovary; e, cross-section of the same; f, a fruit in the calyx; g, a fruit after dehiscence; h, a seed.

Oreocharis Benth.

Oreocharis Benthami C. B. Clarke in DC. Monogr. Phanerog. V.-1, p. 63, t. 5; Hance in Journ. Bot. (1883), p. 165; Forbes et Hemsl. Ind. Fl. Sin. II. p. 226.

Hab.

Distrib. Kwangtung.

I have seen the species at Hongkong, and remember that I saw a plant in Formosa. It is not yet represented from Formosa in the Tōkyō Herbarium.

Chirita Ham.

Chirita anachoreta Hance; Matsum. et Hayata Enum. Pl. Formos. p. 288.

Hab. Nantō: Rakurakusha, leg. G. Nakahara, Aug. 1905, (No. 476).

Acanthaceæ.

Hemigraphis Nees.

Hemigraphis reptans T. Anders. ex Hemsl. in Bot. Voy. Challenger, I.-3, p. 173.

Hab. Kōtōshō, leg. G. Nakahara, Mart. 1906.

Distrib. Ins. Arou.

Lepidagathis Willd.

Lepidagathis formosensis Clarke sp. nov. (in sched.), Typ. in Herb. Kew.

Lepidagathis hyalina Hayata in Matsum. et Hayata Enum. Pl. Formos. p. 293, (non Nees). Suffrutescens erecta, gracilis 45 cm. alta, caulis tetragonus, (angulis acutis), angustissime alatus, subglaber, vel parcissime pubescens. Folia oblongo-ovata, cum petiolis 8-10 cm. longa, 2-2½ cm. lata, apice obtusa, basi subito angustata, in petiolum 2 cm. longum attenuata, margine repandata, chartacea, utrinque brevissime parcissime pubescentia, supra exsiccato fuscentia, subtus pallidissima, costis et venis utrinque tenuiter elevatis, venis lateralibus utrinque 4, prope marginem anastomosantibus. Spicæ terminales vel axillares, sessiles, 3-5-congestæ, oblongo-ovatæ, 1-2 cm. longæ, floribus dense secundatim dispositis, bracteis lanceolatis, extus hirsutis, 5-6 mm. longis imbricatis. Calyx tubulosus 6 mm. longus, 5-fidus, extus barbatus, laciniis lanceolatis acuminatis, longe aristatis, 1-costatis, marginatis, inæqualibus, posteriore latissimo, lateralibus angustissimis, anterioribus longissimis. Corolla 8-9 mm. longa, tubuloso-campanulata,

extus brevissime reflexo-pubescens, tubo 3½ mm. longo, apice leviter constricto, limbo campanulato basi intus reflexo-barbato, 4-lobato, lobis oblongis, rotundatis, apice rotundatis, lobo postico latissimo, apice breve et obscure 2-dentato vel integro. Ovarium ovatum hirsutum, stylo parcissime hirsuto, stigmate oblongo-capitato. Discus annularis leviter 5-lobatus.

Hab. Biōritsu, leg. S. Nagasawa, (Nos. 670 et 356).

The type of the late C. B. Clarke is preserved in the Herbarium at Kew. I have compared my specimens with the type and found that they are exactly identical. So far as I am aware, the description of this species has not been published before, owing to the untimely death of the eminent authority who determined it. The description here given is drawn from my own specimen, but not from Clarke's type.

Lepidagathis stenophylla Clarke sp. nov. (in sched.) Typ. in Herb. Kew. Suffruticens, circ. 40 cm. alta, caulis erectus, gracillimus, rectus vel flexuosus, tetragonus, (angulis acutis), superiore angustissime subalatus, parce pubescens. Folia angustissime linearia, 7 cm. longa, 3 mm. lata, subsessilia vel breve peliolata leviter falcato-recurvata vel subrecta, apice obtusa basi gradatim angustata in petiolum 3 mm. longum attenuata, margine repandata, utrinque brevissime parce pubescentia, chartacea, venis lateralibus patentissimis, a costis angulo 90° divaricatis utrinque elevatis tenuibus, subtus pallidiora. Spicæ ovatæ vel elongato-ovatæ, terminales vel axillares, 13 mm. longæ, bracteis dense imbricatis lanceolatis acuminatis, 5 mm. longis, 1½ mm. latis, apice aristatis margine ciliatis, dorso tenuiter barbatis, 1-costatis, floribus sessilibus. Calyx tubuliformis, extus adpresso-barbatus intus glaber, 6 mm. longus, 5-fidus, segmentis 1-costatis, aristatis, marginatis

ciliatis, inæqualibus, posterioribus latissimis lanceolatis, lateralibus angustissimis brevissimis, anterioribus longissimis. Corolla calycem vix superans tubuloso-campanulata, tubo $1\frac{1}{2}$ mm. longo, ad faucem valde constricto, subgloboso, glabro, limbo campanulato extus reflexo-pubescente, intus glabro basin barbato, 4-lobato, lobis rotundato-ovatis, lobo postico apice breve 2-dentato. Stamina 4, ad basin limbi corollæ affixa, antheris locellis distinctis. Ovarium ovatum hirsutum. Stylus parce hirsutus, stigmate capitato-globoso. Discus annularis leviter 5-lobatus.

Hab. Botansha, leg. K. Miyake, Jan. 1900.

The type of the late C. B. Clarke is preserved in the Herbarium at Kew. I have compared my specimens with the type at Kew and found that they are exactly identical with it. So far as I am aware, the description of this species has not been published before, owing to the untimely death of the eminent authority. The description here given is drawn up from my own specimen, but not from Clarke's type.

Dicriptera Juss.

Dicliptera longiflora Hayata sp. nov. Herba pubescens, vel leviter breve lanata, demum glabrata, caulibus angulatis sulcatis lanato-pubescentibus, pilis patentibus. Folia opposita, petiolata, oblonga, 9 cm. longa, 4 cm. lata, apice cuspidato-acuminata, ad summum obtusa, basi acuta leviter obliqua, costis et venis utrinque prominulis, venis primariis utrinque latere 4, utraque pagine primum dense breve lanata demum glabrata, petiolis 3 cm. longis. Cymæ terminales paucifloratæ, ad ramos 2-bracteatæ, bracteis subulatis acuminatis basi dilatatis $2\frac{1}{2}$ mm. longis. Flores 5-6 fasciculati, sessiles, basi bracteis 2

oppositis suffulti, bracteis magnis ovatis 2½ cm. longis, 1½ cm. latis, acutis, plicatis, viridibus membranaceis venulis reticulatis elevatis, bracteolis intra bracteas triangularibus connatis. Calyx tubuloso-campanulatus, 4 mm. longus, alte 5-lobatus, lobis lanceolatis 2½ mm. longis acutis. Corolla extus laxe pubescens, 4½ cm. longa, tubo tenui 2½ cm. longo, superne vix ampliato, limbo longe 2-labiato, labio posteriore interiore erecto oblongo 2 cm. longo,1 cm. lato apice breve 3-lobo, (lobis rotundatis 1 mm. longis), anteriore latiore patente convexiusculo, obovato 2 cm. longo, 13 mm. lato. Stamina 2, erecta, fauce affixa, labio posteriore breviora, filamentis 1½ cm. longis, pilis patento-reflexis pubescentibus. Ovarium late cylindricum 1½ mm. longum apice acutum, stylo filiformi 2½ cm. longo, stigmate truncato. Discus annularis, ½ mm. longus.

HAB. Formosa.

Near *D. chinensis*; remarkable for the very long corolla which is as long as 4½ cm.

Verbenaceæ.

Clerodendron LINN.

Clerodendron glaberrimum HAYATA sp. nov. Ramuli subtetragoni viridissimi, glabri. Folia opposita, exstipulata, longe petiolata, oblongo-obovata vel oblanceolata, 20 cm. longa, 6 cm. lata, apice acuminata, basi obtusa vel rotundata, leviter obliqua, sub-trinervia, venis primariis utrinque latere 6-7, a costa angulo 50° egressis, arcuatis ad marginem anastomosantibus, venis secundariis transversis distinctis, basi 2-3-glandulifera, utrinque glaberrima viridissima, petiolis 8 cm. longis basi apiceque granuloso-glandulis aggregatis instructis. Cymæ paniculatæ, paniculis terminalibus ramosis,

ramis dichotome furcatis, divaricatis, leviter pubescentibus, bracteis linearibus 2-3 mm. longis. Calyx campanulatus breve pubescens, 3 mm. longus, 2½ mm. latus, 5-lobatus, lobis triangularibus, acutis 1 mm. longis, plus minus glanduliferis. Corolla infundibulo-tubuliformis, tubo longissimo leviter inclinato 12 mm. longo sursumi nfundibuliformi, limbo 5-lobato, lobis patentibus oblongis 4 mm. longis 2 mm. latis apice rotundatis, tortuosis. Stamina 4, sub fauce corollæ affixa, 2½ cm. longa involuta, antheris oblongis 1½ mm. longis apice obtusis basi sagittatis. Ovarium obovatum 1½ mm. longum, irregulariter 8-sulcatum glabrum, imperfecte 4-loculare, vel perfecte 2-loculare, stylo filiformi 22 mm. longo, stigmate subulato 2-fido.

Hab. Randaizan, leg. B. Hayata et U. Mori, Aug. 1908, (No. 7045).

Remarkable for its glabrous leaves, retaining its fresh green colour even in a dried specimen, and quite glabrous panicles. Near *C. acuminatum* Wall. and *C. disparifolium* Blume, but differs from them in having smaller flowers, more profusely dichotomous cymes, and oblanceolate leaves.

Clerodendron koshunense Hayata sp. nov. Rami longitudinaliter rugulosi, cinerascentes, cicatricibus foliorum elevatis cupuliformibus obtecti, lenticellis oblongis, plus minus elevatis, ramulis oppositis, angulatis fusco-pubescentibus. Folia chartacea, opposita, oblonga, vel oblongo-ovata, 8 mm. longa, 4½ cm. lata, apice breve acuto-cuspidata, vel acuta, basi rotundato-acuta, margine remote dentato-serrata, vel remote mucronato-serrata, serris mucronatis prope apicem basinque integra, ad costas et venas parce pubescentia, subtus pallida, ad costas venasque parcissime pubescentia, ad paginam glabra, prope basin costamque glandulis rubris rotundatis dispersa, petiolis 2-3 cm. longis supra sulcatis,

dense pubescentibus. Cymæ terminales, 8 cm. longæ, 7 cm. latæ, ramosæ, ramis pubescentibus, bracteis linearibus, pubescentibus, 7 mm. longis, pedicellis 5 mm. longis. Flores 23 mm. longi. Calyx obconico-campanulatus, 12 mm. longus 5-gonus, tenuiter pubescens, 5-lobatus, lobis elongato-triangularibus 7 mm. longis, acutis 3 mm. latis obscure 3-nerviis, margine ciliolatis. Corolla tubuloso-campanulata, 23 mm. longa, utrinque glabra, tubo tenuissimo 13 mm. longo, 1½ mm. lato, intus paucissime hirsuto, limbo campanulato, 5-lobato, lobis oblongis apice obtusis 8 mm. longis, 4 mm. latis, margine ciliolatis. Stamina 4, tubi fauce affixa, filamentis 2 cm. longis, complanatis, filiformibus glabris, longe exsertis, recurvatis, antheris oblongis 2¼ mm. longis. Ovarium oblongo-globosum, 1½ mm. longum, stylo filiformi 3½ cm. longo, apice brevissime 2-lobato.

HAB. Kōshūn : Kururusha, leg. T. KAWAKAMI, Juli. 1906, (No. 1646).

Near *C. trichotomum* THUNB., but differs from it in having much acuter calyx-lobes.

Callicarpa LINN.

Callicarpa boninensis HAYATA sp. nov. Rami albicante-cinerascentes, glabri, longitudinaliter rugulosi, cortice hac atque illac transverse fisso-striato sursum foliati, densissime stellato-tomentosi, cicatricibus foliorum rotundatis prominentibus majusculis notati. Folia prope apicem ramulorum approximate oppositeque disposita, oblongo-ovata, 7 cm. longa, 37 mm. lata, membranaceo-chartacea, apice rotundata, vel obtusa brevissime cuspidatata, (cuspidibus 3-5 mm. longis), basi cuneato-acuta, supra fuscentia, ad costas et venas plus minus dense stellato-tomentosa,

pilis brevissimis, ad paginam paucissime tomentosa, vel subglabrata, venis impressis, margine minute denticulato-serrulata, deorsum integra, subtus pallida ad costas venas et venulas prominentes densissime, ad paginam dense, stellato-tomentosa, utrinque glandulis punctiformibus minutis flavis nitidis et glandulis cupuli formibus rubescentibus pauce dispersa, petiolis 2 cm. longis dense tomentosis, supra plano-sulcatis, bracteis lanceolatis vel ovatis obtusis circ. 1 mm. longis, bracteolis minoribus. Flores $3\frac{1}{2}$ mm. longi, parce fulvo-punctati, glabri. Calyx campanulato-cupuliformis $1\frac{1}{2}$ mm. longus, 4-dentatus, dentibus latissimis obscuris. Corolla $3\frac{1}{4}$ mm. longa, 4-lobata, lobis rotundatis, basi leviter contractis, $1\frac{1}{2}$ mm. longis totiusque latis. Stamina 4, longe exserta, 6 mm. longa, filamentis glabris, antheris oblongo-ovatis $1\frac{1}{2}$ mm. longis. Ovarium conicum $\frac{1}{2}$ mm. longum dense pulvibus flavis obtectum, stylo brevissimo $\frac{1}{10}$ mm. longo, stigmate globoso minuto.

Hab. Bonin : Chichijima, leg. Okada.

Callicarpa kotœnsis Hayata sp. nov. Rami validiusculi cinerascentes lenticellati glabrati, ramulis fusco-rubescentibus stellato-tomentosis. Folia opposita, petiolata, exstipulata, ovato-lanceolata, $8\frac{1}{2}$ cm. longa $3\frac{1}{2}$ cm. lata, apice cuspidato-acuminata, basi gradatim acuta, margine serrata, serris obtusis vel apiculatis, basi integra, venis primariis utrinque latere 6-7, venis basilaribus cum marginibus parallelis, ad costas venasque stellato-tomentosa cæterum glabrata, (foliis novellis dense stellato-tomentosis), subtus pallidiora, petiolis 1 cm. longis. Cymæ axillares pauce ramosæ, ramis divaricatis, pedunculis 1 cm. longis, pedicellis 2 mm. longis, bracteis minutis, subulatis, ramis omnibus stellato-tomentosis. Calyx late campanulatus extus pauce glanduloso-pulveraceus $1\frac{1}{2}$ mm. longus, 2 mm. latus, brevissime latissimeque

dentatus, dentibus acutis. Corolla tubuloso-campanulata 5 mm. longa, extus pauce glanduloso-pulveracea, tubo 3 mm. longo, 1½ mm. lato, limbo 4-lobato, lobis 4 rotundatis 1½ mm. longis. Stamina 4, basi corollæ affixa exserta, filamentis filiformibus 6½ mm. longis, antheris oblongis 1½ mm. longis, apice emarginatis, basi sagittatis. Ovarium globosum ½ mm. longum, stylo filiformi 8 mm. longo, stigmate dilatato, 2-lamellato. Drupa globosa 5 mm. longa, calyce inclusa, epicarpio succoso, endocarpio indurato, in pyrenas 4 secedente, pyrenis ovatis dorso convexis ventrali concavis, 2½ mm. longis, 2 mm. latis. Semina oblonga 1½ mm. longa, ⅘ mm. lata, testa membranacea.

Hab. Kōtōshō, leg. K. Miyake, Nov. 1899.

Near *C. psilocalyx* Clarke and *C. longifolia* Lam., but differs from both by the larger flowers and less hairy leaves.

Callicarpa longifolia Lam. var. **longissima** Hemsl. in Forbes et Hemsl. Ind. Fl. Sin. II. p. 253.

Hab. Uraisha, leg. N. Konishi, Aug. 1907 ; Nankōkei, leg. G. Nakahara, Aug. 1905, (No. 231).

Distrib. Kwangtung.

Observ. Ramuli graciles, tetragoni, glabri ad nodos intra petiolos pilis barbatis instructi, fusco-purpurascentes. Folia opposita, petiolata, oblanceolata, 23 cm. longa, 4 cm. lata, apice acuminata basi attenuata, margine subintegra vel serris minutis obscuris instructa, supra in exsiccato fuscentia, subtus fulvo-pallidiora, supra ad costas venasque dense, cæterum parce, pubescentia, subtus glabrata, prope costas 1-seriatim glandulifera, glandulis orbicularibus depressis, utraque pagine sub lente minute glanduloso-punctata, petiolis 1½ cm. longis supra pilosiusculis. Cymæ axillares vel terminales paniculatæ, ramis panicularum gra-

cilibus, pubescentibus, divaricatis, bracteatis, bracteis lincaribus 2-3 mm. longis. Calyx campanulatus 1 mm. longus, 4-dentatus, glanduloso-punctatus. Corolla campanulata, 3 mm. longa, 2 mm. lata, 4 lobata, lobis rotundatis 1 mm. longis. Stamina 4, exserta, 6 mm. longa, filamentis filiformibus, antheris ½ mm. longis, oblongis apice retusis basi sagittatis. Ovarium obovatum, glanduloso-punctatum ½ mm. longum, stylo filiformi 6 mm. longo, stigmate dilatato 2-lamellato.

Near *C. longifolia* Lam., from which the present plant differs in having glabrous subentire leaves and glabrous calyx.

Callicarpa mollis Sieb. et Zucc. Fl. Jap. Fam. Nat. n. 526; Franch. et Sav. Enum. Pl. Jap. I. p. 359; Maxim. in Mél. Biol. XII. p. 505; Forbes et Hemsl. Ind. Fl. Sin. II. p. 254.

Hab. Okinawa, leg. Y. Tashiro, 1887, Mart.

Distrib. Corean archipelago and Japan.

Callicarpa oshimensis Hayata sp. nov. Rami recti, rubro-cinerascentes vel cinerascentes, longitudinaliter rugulosi, cortice plus minus soluto, ramulis gracillimis, rectis oppositis divaricatis, foliatis, brevissime tomentosis. Folia rhomboideo-ovata, 6½ cm. longa, 3 cm. lata, apice cuspidata, (cuspidibus 1 cm. longis 4 mm. latis), basi subito cuneata ima obtusa, margine dentata, (dentibus plus minus irregularibus, divaricatis, triangularibus 3 mm. latis, totiusque longis), sursum in acumina, deorsum prope basin, integra, supra exsiccato fuscentia, subtus minute parcissime stellato-pubescentia, demum subglabrata, costis et venis tenuissimis, subtus pallidissima ad costas et venas prominentes stellato-tomentosa, ad paginam minute glanduloso-punctata, punctis purpureis, minutis, petiolis 6 mm. longis supra plano-sulcatis, stellato-tomentosis. Cymæ axillares

petiolum in longitidine 2-plo superantes. Calyx subinteger, vel leviter dentatus.

Hab. Oshima, leg. T. Uchiyama, Dec. 1900.

Remarkable for its small dentate leaves.

Callicarpa parvifolia Hayata sp. nov. Rami cineraceo-albicantes, subglabri, ramulis gracilibus, divaricatis, brevissime pubescentibus, lenticellis elevatis notatis, prope apicem breve tomentosis, pilis stellatis. Folia oblongo-lanceolata, 4½ cm. longa, 1 cm. lata apice acuminata, basi obtusa, vel acuta, margine serrulata, sursum in acumina, et deorsum prope basin, integra, exsiccato supra fuscentia, ad costas venasque brevissime pubescentia, ad paginam parcissime brevissime pubescentia, subtus pallidissima, parcissime stellato-pilosa, prope basin costamque glandulis minutis punctiformibus impressis dispersa, et ad totam paginam glandulis minutissimis flavis nitidis punctata, petiolis 3 mm. longis, brevissime tomentosis. Cymæ axillares, petiolum 2-plo superantes. bracteis angustatis 1½ mm. longis crassiusculis, pedicellis 1½ mm. longis, floribus parvioribus 2½ mm. longis glabris flavo-punctatis. Calyx campanulato-cupuliformis 1½ mm. longus irregulariter 3-4-lobatus, lobis obtusis. Ovarium globosum dense flavo-punctatum, stylo sursum dilatato, stigmate 2-lobato.

Hab. Taitō : Daimari, leg. T. Kawakami et U. Mori, (No. 2879).

Callicarpa randaiensis Hayata sp. nov. Rami graciles, cinereo-rubescentes glabrati, lenticellati, ramulis stellato-tomentosis divaricatis. Folia opposita petiolata exstipulata, oblongo-lanceolata, 10 cm. longa, 3 cm. lata, margine serrata, (serris apiculatis), basi integra, apice acuminata, basi acuta, utraque pagine glabrata, ad costas venasque stellato-tomentosa, (foliis novellis stellato-tomentosis),

petiolis 1 cm. longis. Cymæ axillares pauci-ramosæ, ramis brevibus divaricatis, pedunculis 1½ cm. longis, pedicellis 1-2 mm. longis, bracteis minutis subulatis. Calyx campanulatus, 2 mm. longus, late dentatus, dentibus triangularibus, acutis, extus glanduloso-pulveraceus. Corolla tubuloso-campanulata, 5½ mm. longa, extus glanduloso-pulveracea, tubo 4 mm. longo, 2½ mm. lato, 5-lobata, lobis rotundatis 1½ mm. longis, patentibus. Stamina 4, exserta basin corollæ affixa, 7 mm. longa, filamentis filiformibus 6½ mm. longis, antheris oblongis, 2 mm. longis, 1 mm. latis apice truncatis, basi sagittatis. Ovarium ovoideum 1½ mm. longum apice attenuatum, stylo filiformi 8 mm. longo, stigmate dilato late 2-fido.

Hab. Randaizan, leg. U. Mori, Aug. 1908, (No. 7023).

Near *Callicarpa japonica* Thunb., from which the present plant differs in having lanceolate leaves. Also near *C. gracilis* Sieb. et Zucc. and *C. elegans* Hayek., but differs from the former by the more conspicuously serrulate leaves, and from the latter, in having less acuminate, more hairy, leaves and larger flowers.

Callicarpa remotiserrulata Hayata sp. nov. Rami cinerascentes, longitudinaliter rugulosi, rugulis prominentibus, ramulis parcissime pubescentibus vel glabratis. Folia lanceolata vel oblongo-lanceolata, chartaceo-coriacea, 8 cm. longa, 2 cm. lata, apice acuminata, basi cuneato-attenuata, margine remote mucronato-serrata, (serris mucronatis, ½ mm. longis totiusque latis, obtusis, 5 mm. a se remotis), prope apicem basinque integra, exsiccato utrinque pallidiora, interdum supra fuscentia, utrinque glabra, costis et venis utrinque tenuiter elevatis subtus parcissime flavo-punctata, basi ad insertionem petiolorum supra 1-glandulifera, glandulis impressis majusculis, petiolis 6 mm. longis brevissime stellato-

tomentosis supra sulcatis. Cymæ axillares vel terminales petiolum in longitudine 2-3-plo superantes. Calyx campanulato-cupuliformis, irregulariter obscureque dentatus. Fructus 2½ mm. in diametro.

HAB. Kōshūn : Botanrosha, leg. G. NAKAHARA, 1906, (No. 619).

Labiatæ.

Mesona BLUME.

Mesona elegans HAYATA in MATSUM. et HAYATA Enum. Pl. Formos. p. 306, t. 16 ; HAYATA Fl. Mont. Formos. p. 181.

Near *M. chinensis* BENTH.

Acrocephalus BENTH.

Acrocephalus capitatus BENTH. in DC. Prodr. XII. p. 47 ; HOOK. f. Fl. Brit. Ind. IV. p. 611 ; HOOK. Ic. Pl. t. 456 ; FORBES et HEMSL. Ind. Fl. Sin. II. p. 269.

HAB. Tainan, Tikuchishishō, leg. G. NAKAHARA, Oct. 1905, (No. 5970).

DISTRIB. South China, Tropical Asia, Africa, and Australia.

Plectranthus L'HÉRIT.

Plectranthus lasiocarpus HAYATA sp. nov. Herba, erecta, gracilis, 50-60 cm. alta, pauce ramosa, caulibus tetragonis breviter pubescentibus, sulcatis. Folia opposita, petiolata, oblonga, 42 mm. longa, 17 mm. lata, apice acuta, basi, in petiolum attenuata, margine a medio sursum serrata, (serris acutis), deorsum integra, utrinque scabra, subtus ad costas venasque breve pubescentia, pallidiora.

Cymæ oppositæ, racemosæ, vel paniculatæ, bracteis et bracteolis minoribus. Calyx jam anthesin campanulatus 1½ mm. longus pubescens, (fructifer auctus), 5-lobatus, lobis inæqualibus acutis, lobis posterioribus 3 minoribus, anterioribus 2 longioribus. Corollæ tubus exsertus latus, basi postice gibbosus declinatus medio subrectus, fauce æquali ; limbus 2-labiatus, labro posteriore breviter 3-lobato, lobis reflexis, labro anteriore integro tubis longiore, concavo. Stamina 4, didynama declinata, filamentis liberis basi pubescentibus ; antheræ confluentes 1-loculares, demum explanatæ. Discus in glandulam ovoideam brevem productus. Stylus apice integer. Nucula 2-3, matura ovoidea, 1½ mm. longa, 1 mm. lata, apice rotundata, basi oblique acuta, pubescens, minute albo-puncticulata.

Hab. Shintengai, leg. S. Nagasawa, (No. 458) ; Toroku : Rinkiho, leg. T. Kawakami et U. Mori, Nov. 1906, (No. 1761).

Coleus Lour.

Coleus mucosus Hayata sp. nov. Caulis obtuse tetragonus, sulcatus, glabratus, ramosus, ramulis gracilibus adpresse pubescentibus, divaricatis. Folia opposita, petiolata, late ovata, vel globosa 3½ cm. longa totiusque lata, apice breve acuminata, basi rotundata vel truncata ima basi acuta, utrinque breve pubescentia, subtus pallidiora, nigro-punctata, petiolis 5-7 mm. longis. Verticillaster superpositus racemose dispositus. Racemi verticillastrorum terminales 15-20 cm. longi, pedicellis pubescentibus punctatis, 1 cm. longis. Calyx ovoideo-campanulatus, 1½ mm. longus, basi postice leviter gibbosus, extus glanduloso-punctatus pubescens intus glaber, lobo postico late ovato 1 mm. longo apice obtuso, cæteris majoribus, lateralibus ovato-truncatis ½ mm. longis, anticis acutis 1¼ mm. longis, sæpe ultra medium connatis ; fructifer

declinatus. Corollæ tubus basi recurvus supra basin horizontaliter declinatus, fauce ampliatus 1½ mm. in sectione; limbus 2-labiatus, labro posteriore obtuso emarginato erecto patente, anteriore elongato integro concavo cymbiformi genitales includenti. Stamina 4, didynama, vel subæqualia declinata, filamentis 3 mm. longis basi breviter in tubum 1 mm. longum a corolla liberum connatis; antheræ confluentes 1-loculares, demum explanatæ. Discus antice in glandulam ovario longiorem tumens. Stylus apice subulatus æqualiter 2-fidus. Nuculæ ovoideæ ¾ mm. longæ compressiusculæ læves, minute rubro-punctatæ.

HAB. Kodenshō, leg. T. KAWAKAMI et U. MORI, Oct. 1906, (No. 1755); S. NAGASAWA, Oct. 1905, (No. 746); Banchoryō, leg. G. NAKAHARA, Oct. 1905, (No. 582); Kashitō, leg. G. NAKAHARA, Aug. 1905, (No. 302).

The seeds of the present plant afford a considerable amount of mucilage when soaked in water.

Hyptis JACQ.

Hyptis spicigera LAM. "Encyc. III. p. 185".

HAB. Kanaiho, leg. G. NAKAHARA, Oct. 1905, (No. 617).

DISTRIB. Tropical America and Africa.

Dysophylla BLUME.

Dysophylla glabra HAYATA sp. nov. Caulis obtuse tetragonus, rubescens, glaber. Folia opposita, sessilia, ovata, 4 cm. longa, 22 mm. lata, apice acuta, basi rotundata, vel truncata, margine dentato-serrata, (serris acutis), utrinque glabra. Verticillaster fasciculatus dense spicatim dispositus, spicis 4 cm. longis 1 cm.

latis, bracteis lanceolatis flore æquilongis 5 mm. longis, pedicellis brevissimis 1 mm. longis. Calyx globoso-campanulatus, 1½ mm. longus, 10-nervatus basi æqualis leviter 5-dentatus, dentibus posterioribus 3 brevioribus, anterioribus 2 longioribus. Corolla campanulata, tubo exserto, 1½ mm. longo, limbo patente, 4-fido, lobo postico majore late ovato erecto emarginato, lobis anticis patentibus. Stamina 4, exserta, paullum inæqualia, subdeclinata, fauce corollæ affixa, filamentis 3 mm. longis; antheræ globosæ, 2-loculares, apice emarginatæ, basi sagittatæ terminales. Discus æqualis subinteger. Stylus apice breviter 2-fidus, lobis subulatis æqualibus.

Hab. Tamsui, leg. Z. Kobayashi, Aug. 1905, (No. 515).

Elsholtzia Willd.

Elsholtzia cristata Willd., Benth. in DC. Prodr. XII. p. 163; Hook. f. Fl. Brit. Ind. IV. p. 645; Franchet Pl. David. p. 234; Bot. Mag. t. 2560; Forbes et Hemsl. Ind. Fl. Sin. II. p. 277.

Hab. Byōritsu: Rokujōdaizan, leg. T. Kawakami et U. Mori, 1908, (No. 7257).

Distrib. Japan, Corea, China: Hupeh, Kiangsi. North India, and Siberia to Manchuria.

Lycopus Linn.

Lycopus lucidus Turcz. ex Benth. in DC. Prodr. XII. p. 178; Franchet Pl. David. p. 235; Franch. et Sav. Enum. Pl. Jap. I. p. 367; Forbes et Hemsl. Ind. Fl. Sin. II. p. 282.

Hab. Sekikō: leg. G. Nakahara, Sept. 1905, (No. 411).

Distrib. Siberia, Manchuria, Japan and China.

Calamintha Mœnch.

Calamintha laxiflora Hayata sp. nov. Herba procumbens, caulibus adpresse pubescentibus obtuse tetragonis. Folia opposita, petiolata, ovata, apice obtusa, basi rotundata, ima basi acuta, 18 mm. longa 10 mm. lata, a medio sursum serrata, deorsum integra, (serris obtusis), utrinque hispidula vel subglabrata, subtus purpurascentia, petiolis brevibus 1-2 mm. longis. Flores axillares solitarii, vel gemini, pedicellis 1 mm. longis, bracteis linearibus $3\frac{1}{2}$ mm. longis, $\frac{1}{4}$ mm. latis, purpurascentibus ciliatis. Calyx tubulosus $7\frac{1}{2}$ mm. longus, 12-nervius, ad nervos pilis 1 mm. longis obtectus, 2-labiatus, labro posteriore patente 3-dentato, dentibus cuspidatis $1\frac{1}{2}$ mm. longis $\frac{3}{4}$ mm. latis margine hispidis, labro anteriore 2-partito, segmentis linearibus $3\frac{1}{2}$ mm. longis $\frac{1}{3}$ mm. latis margine hispidis, fauce intus hispidulus. Corollæ tubus exsertus, 11 mm. longus leviter recurvus ad faucem ampliatus 3 mm. in diametro, limbus 2-labiatus, labro posteriore plano $2\frac{1}{2}$ mm. longo, apice 2-lobato, labro anteriore patente 5 mm. longo 3-fido, lobis planis, medio latiore late rotundato 3 mm. lato. Stamina 4, didynama (anterioribus longioribus), ascendentia, antheræ 2-loculares, loculis distinctis divergentibus, connectivo sæpius incrassato. Discus æqualis. Styli lobus anterior longior complanatus.

Hab. in monte Morrison, ad 9000 ped. alt., leg. T. Kawakami et U. Mori, Nov. 1906, (Nos. 1900 et 1921).

Melissa Linn.

Melissa parviflora Benth. var. **purpurea** Hayata n. v. Caulis glaber, distincte 4-gonus, profunde sulcatus, ramosus, ramulis gracilibus, glabris. Folia opposita, petiolata, ovato-lanceolata,

5 cm. longa, 2 cm. lata, apice acuta, basi gradatim angustata in petiolum longum attenuata, margine dentata, dentibus obtusis ascendentibus, deorsum integra, utrinque glabra, subtus pallidiora et purpurascentia, petiolis 2 cm. longis. Verticillaster 3-5 floratus, axillaris, oppositus, pedicellis 4 mm. longis. Calyx tubuloso-campanulatus 8 mm. longus 11-nervius, (nervis 5 prominentibus longe pilosis, pilis patentibus, nervis 6 obscuris glabris), 2-labiatus, labro posteriore subplano reflexo, 3-dentato, dentibus latis rotundato-acutis, labro anteriore 2-partito, segmentis lanceolatis, fauce intus nudus fructifer declinatus. Corolla tubulosa 1 cm. longa, tubo subincluso, recurvo-ascendente, superne paullum ampliato, intus extusque nudo, limbo 2-labiato, extus piloso, labro posteriore erecto lato profunde emarginato 1 mm. longo, anteriore patente 3-fido, lobis planis rotundatis 1 mm. longis, intermedio majore emarginato. Stamina 4, subæqualia, anterioribus paulo longioribus, infra labrum posticum arcuato-conniventia; antheræ 2-loculares, loculis divergentibus. Discus æqualis; styli 7 mm. longi inclusi, lobis subæqualibus, subulatis recurvis. Nucula obovoidea $\frac{7}{4}$ mm. longa, $\frac{3}{4}$ mm. lata rubescens, lævis, apice rotundata basi attenuata.

Hab. in monte Morrison ad 9000 ped. alt., leg. T. Kawakami et U. Mori, Oct. 1906, (No. 1813); Tōzan, in montibus Morrison, leg. G. Nakahara, Oct. 1906.

Near *M. officinalis* Linn. of Europe and *M. parviflora* Benth. of the Himalayas.

Dicotyledones.

Monochlamydeæ.

Amarantaceæ.

Celosia Linn.

Celosia taitœnsis Hayata sp. nov. Caulis erectus glaber, sulcatus, albicans. Folia lanceolata, vel lineari-lanceolata, membranacea 19 cm. longa, 17 mm. lata, apice acuminata, basi attenuata, margine repandato-integra, costis subtus prominentibus, venis lateralibus tenuissimis, petiolis $2\frac{1}{2}$ cm. longis. Spicæ densissime floratæ, axillares et terminales, axillaribus ovatis apice acuminatis, circ. 2 cm. longis, terminali cylindrico-ovata apice flabellato-dilatata, 4 cm. longa, $1\frac{1}{2}$ cm. lata. Flores brevissime pedicellati, pedicellis $\frac{2}{3}$ mm. longis, basi 1-bracteatis, bracteis lanceolato-acuminatis, 5 mm. longis, hyalinis, 2-bracteolatis, bracteolis bractea conformibus, ovato-acuminatis, 4 mm. longis, $1\frac{1}{2}$ mm. latis, apice dorso aristatis. Perianthii segmenta erecta, 3 exteriora, 2 interiora, æqualia, oblongo-ovata, 5 mm. longa, 2 mm. lata, cærulea, hyalina, apice acuminato-acuta. Stamina 5, vix exserta, filamentis hyalinis, complanatis, basi in tubum brevem connatis, antheris angustato-oblongis, $1\frac{1}{4}$ mm. longis. Ovarium obconicum, 1 mm. longum, prope basin ad marginem contractum margine leviter recurvum, stylo columnari 3 mm. longo apice truncato stigmatoso.

Hab. Taitō, Hakaye, leg. T. Kawakami et U. Mori, 1907, Oct. (No. 6005).

Ærua Forsk.

Ærua scandens Wall.; Hook. f. Fl. Brit. Ind. IV. p. 727 ; Moq. in DC. Prodr. XIII.-2, p. 302 ; Forbes et Hemsl. Ind. Fl. Sin. II. p. 321 ; Matsum. et Hayata, Enum. Pl. Formos. p. 327.

Hab. Kōshūn: Botansha, leg. G. Nakahara, Dec. 1906, (No. 939).

Distrib. China : Kwangtung ; India, Malaya, to the Philippines and in west tropical Africa.

Chenopodiaceæ.

Suæda Forsk.

Suæda maritima Dumort. ; Hook. f. Fl. Brit. Ind. V. p. 14 ; Forbes et Hemsl. Ind. Fl. Sin. II. p. 329.

Hab. Anping, leg. S. Nagasawa, Dec. 1904, (No. 250) ; Takaw, leg. B. Hayata et Y. Shimada, Aug. 1908, (No. 92).

Distrib. Dispersed all round the northern hemisphere.

This is perhaps the plant recorded from Formosa as *Suæda nudiflora* in Forbes et Hemsl. Ind. Fl. Sin. II. p. 330 ; for I could not find any other *Suæda* in the island. As my plant has 2-styles, it is not to be referable to *S. nudiflora*, but quite identical with the plant figured in Wight Ic. t. 1793, which is rendered by Sir J. D. Hooker a synonym of *S. maritima*. It demands further investigation whether or not this is exactly the same as the European *S. maritima*.

Polygonaceæ.

Polygonum Linn.

Polygonum alatum Hamilt., Hook. f. Fl. Brit. Ind. V. p. 41 ; Forbes et Hemsl. Ind. Fl. Sin. II. p. 332.

Hab. Randaizan, leg. B. Hayata et U. Mori, Aug. 1908, (No. 7071).

Distrib. Afghanistan to Ceylon, Japan and China, and the Malay Archipelago, and in Abyssinia.

Polygonum biconvexum Hayata Fl. Mont. Formos. p. 184.

Near *P. arifolium* Linn., differs from it in having biconvex seeds.

Polygonum glabrum Willd.; Meisn. in DC. Prodr. XIV. p. 114 ; Benth. Fl. Hongk. p. 288 ; Hook. f. Fl. Brit. Ind. V. p. 34 ; Wight Ic. Pl. Ind. Or. t. 1799 ; Forbes et Hemsl. Ind. Fl. Sin. II. p. 340.

Hab. Tenchōshō, leg. T. Kawakami, 1907, Juni. (No. 5879).

Distrib. China ; tropical and subtropical regions in Asia, Africa and America.

Polygonum minus Huds.; Meisn. in DC. Prodr. XIV. p. 111 ; Hook. f. Fl. Brit. Ind. V. p. 36; Forbes et Hemsl. Ind. Fl. Sin. II. p. 342.

Hab. Nantō : Kwakōzan, leg. T. Kawakami et U. Mori, Juli. (No. 3183) ; Shijō (No. 3455).

Distrib. China ; temperate and subtropical Asia and Australia.

Polygonum muricatum Meisn. in DC. Prodr. XIV. p. 133 ; Hook. f. Fl. Brit. Ind. V. p. 45, (var.) ; Forbes et Hemsl. Ind. Fl. Sin. II. p. 343.

Hab. Giochi, leg. G. Nakahara, Aug. 1905, (No. 300).

Distrib. Central and Eastern Himalaya and the Khasia mountains. China : Hupeh.

This is near *P. pedunculare* Wall., but differs from it in having more slender, and more branched peduncles and shortly spicate, but not capitate, sessile flowers. The flowers of *P. pedunculare* are pediceled and capitate.

Polygonum quadrifidum Hayata sp. nov. Herba gracilis, glaberrima 25 cm. alta, caulibus glabratis striatis pauce ramosis internodiis 4 cm. longis. Folia alterna, subsessilia oblonga, 22 mm. longa, 1 cm. lata, apice acuta, basi rotundata in petiolum attenuata, utrinque glabra margine albo-marginata, sub lente minute serrulata, utrinque glanduloso-punctata, membranacea, vaginis tubulosis 3 mm. longis hyalinis basi pilis retrorsis instructis. Flores capitellati, capitulis bracteis involucralibus 1 suffultis, vel bracteis involucralibus 0, (floribus 1-15, 4 mm. longis), pedunculis 2 mm. longis vel longioribus, apice pilosis glandulosis retrorsis instructis, bracteis (floralibus) ovatis $3\frac{1}{2}$ mm. longis 2 mm. latis hyalinis pauce glanduloso-punctatis, pedicellis $\frac{1}{2}$ mm. longis, 1-bracteolatis, bracteolis hyalinis ovatis. Perianthium campanulatum $2\frac{1}{2}$ mm. longum, 4-lobum, lobis ovatis obtusis 1 mm. longis. Stamina 5, eglandulifera. Ovarium ovatum $\frac{3}{4}$ mm. longum, stylo $1\frac{1}{4}$ mm. longo, apice 2-fido, stigmate capitellato. Achænium biconvexum orbiculare vel late ovatum, apiculatum $1\frac{2}{3}$ mm. longum, $1\frac{1}{2}$ mm. latum, minute tuberculatum nigrum.

Hab. in monte Morrison, ad 6500 ped. alt., leg. T. Kawakami et U. Mori, Oct. 1906, (No. 2032).

Near *P. glaciale* Hook. f. from which the present plant differs in having biconvex nuts.

Aristolochiaceæ.

Asarum Linn.

Asarum caudigerum Hance in Journ. Bot. (1881), p. 142; Hemsl. in Gard. Chron. 3-series, VII. p. 422; Bot. Mag. t. 7126; Forbes et Hemsl. Ind. Fl. Sin. II. p. 358.

Hab. Arizan, leg. T. Kawakami et U. Mori, 1908, Mart. (No. 3496)

Distrib. Kwangtung.

Piperaceæ.

Piper Linn.

Piper hispidum Hayata, sp. nov. Caulis procumbens, ad nodos radicans striatus ferrugineo-hispidus, pilis patentibus. Folia petiolata, oblongo-cordata, 5½ cm. longa, 3½ cm. lata, apice obtusa, basi cordata, sinibus basilaribus latis, subintegra, 5-nervia, supra parce hispidula subtus ad nervos tementella, petiolis 2½ cm. longis. Fl. ♂ spicati, spicis oppositifoliis pedunculatis, pedunculis 2 cm. longis, partibus floriferis cylindraceis 3 cm. longis, bracteis peltatis orbicularibus ¾ mm. in diametro.

Hab. Kōshūn; Garanbi, leg. Y. Tashiro, 1896.

Piper Kawakamii Hayata sp. nov. Caulis scandens, glaber, striatus, (internodiis 5 cm. longis), ad nodos radicans. Folia ramis opposita petiolata, ovato-cordata, 12 cm. longa, 7 cm. lata, apice acuta, vel breve acuminata, rotundata, vel rotundato-cordata, margine integerrima, basi sub-5-nervia, membranacea crassiuscula.

Fl. ♂ spicati, spicis pedunculatis, oppositifoliis, cylindraceis 3½ cm. longis, 4 mm. latis, pedunculis 1½ cm. longis. Fl. ♂ subsessiles. Stamina 2, filamentis brevibus, bracteis peltatis, peltis stipitatis 1½ mm. in diametro.

Hab. Kōshūn, Kurarusha, leg. T. Kawakami, Juli. 1906, (No. 1645).

Near *Piper sarmentosum* Roxb., but differs from it by the subcordate leaves with different venation.

Piper kwashœnse Hayata sp. nov. Caulis scandens prostratus, ad nodos radicans, (internodiis 6-7 cm. longis), longitudinaliter rugulosus, rugulis prominentibus. Folia membranaceo-chartacea, cordato-rotundata, 8-10 cm. longa, 5-6 cm. lata, apice rotundata, subito cuspidata, (cuspidibus 1½ cm. longis, 3-4 mm. latis), basi peltato-cordata, vel subpeltata, (ab insertione petiolorum usque ad basin laminæ 2 mm.), margine integerrima, utrinque pallidissima, nervis utrinque tenuibus distincte elevatis, 5-nervia, utrinque pagine glabra, petiolis 4 cm. longis, multistriatis, brevissime pubescentibus. Alabastrum foliorum oppositifolium, cylindricum, 1 cm. longum, 2 mm. latum, 1-perulatum, perulis brevissime fusco-pubescentibus.

Hab. Kwashōtō, leg. T. Kawakami et Z. Kobayashi, 1907, Aug. (No. 475).

Near *P. ornatum* N. E. Brown, but differs from it in having much more cordate leaves with primary lateral veins curving upwards and reaching the apex of the blade.

Piper sarmentosum Roxb.; C. DC. in DC. Prodr. XVI.-1, p. 352; Maxim. in Mél. Biol. XII. p. 533; Forbes et Hemsl. Ind. Fl. Sin. II. p. 366.

Piper Futokadsura Tashiro, (in sched.) Herb. Tōkyō.

Hab. Okinawa, leg. Y. Tashiro, 1884, Juni.

Distrib. Kwangtung, Hongkong, Hainan ; Malay archipelago.

Piper subpeltatum Willd. ; Wight Ic. t. 1925 ; Hook. f. Fl. Brit. Ind. V. p. 95.

Hab. Kōshūn : Kurarusha, leg. T. Kawakami, Feb. 1906, (No. 1439).

Distrib. India, Malay archipelago, Philippines, Tropical Africa and Madagascar.

Myristiceæ.

Myristica Linn.

Myristica laurifolia Hook. f. ?

Hab. Kōtōshō, leg. G. Nakahara, 1906, Dec.

In the imperfectness of the specimen, the determination is rather conjectural.

Laurineæ.

Cryptocarya R. Br.

Cryptocarya chinensis Hemsl. in Forbes et Hemsl. Ind. Fl. Sin. II. p. 370.

Beilschmiedia chinensis Hance in "Journ. Bot. (1882), p. 79."

Hab. Uraisha, leg. N. Konishi, Aprili. 1908, (No. 71).

Distrib. Kwangtung, Hongkong.

Observ. Rami fuscentes vel fusco-rubescentes lenticellati.

Folia alterna, persistentia, petiolata, oblonga, 11 cm. longa, 4½ cm. lata, apice cuspidato-acuminata, (acuminibus 1½ cm. longis apice oblongis), basi acuminata, nervis supra impressis, subtus elevatis, supra basin 3-nervia, nervis lateralibus margine parallelis, supra glabra subtus glauca, utrinque minute reticulata, petiolis 1 cm. longis. Flores paniculati, paniculis axillaribus vel terminalibus, 3 cm. longis, ramosis, ramis sericeo-pubescentibus 1½ cm. longis, floribus ad apicem ramorum ternatim dispositis, pedicellis ½ mm. longis. Perianthium campanulatum 3 mm. longum extus intusque pubescens, tubo 1 mm. longo, limbo 6-lobato, lobis ovatis 2 mm. longis acutis. Stamina perfecta 9, fauce tubi affixa, 2 mm. longa, hirsuta, (filamentis 1¼ mm. longis, antheris ovatis ¾ mm. longis, connectivis vix productis), ordinis primarii et secundarii eglandulosa, ordonis tertii utrinque glandula stipitata aucta, antheris ordonis primarii et secundarii introrsum 2-locellatis, ordinis tertii interdum introrsum interdum extrorsum plerumque laterale 2-locellatis. Staminodia ordinis quarti, subulata 1½ mm. longa. Ovarium perianthii tubo inclusum, longe ovatum apice attenuatum 1 mm. longum, 1-ovulatum, stylo breviter exserto, 1 mm. longo, stigmate oblique truncato. Fructus tubo perianthii aucto indurato depresso-globoso ∞-costato 1 cm. longo 1⅓ cm. lato inclusus, ore clauso limbo deciduo; pericarpium membranaceum tubo perianthii adnatum. Semina depresso-globosa, testa membranacea.

Cryptocarya Konishii Hayata sp. nov. Rami validiusculi angulati, ferrugineo-fuscentes, striati, lenticellis elevatis oblongis. Folia alterna coriacea pallida subnitida oblonga oblongo-obovata, vel oblongo-ovata, 8 cm. longa, 28 mm. lata, apice acuminato-obtusa, basi acuta, integra utrinque glabra, margine leviter reflexa, supra

ad costas sulcata, venis et venulis tenuiter elevatis, subtus glauca costis venis venulisque elevatis distincte reticulata, venis lateralibus primariis utrinque 5-6, a costis angulo 50° egressis, petiolis 1 cm. longis nigricantibus. Fructus oblique oblongo-globosi, 13 mm. longi, nigricantes, obscure 10-costati.

Hab. Uraisha, leg. N. Konishi, Dec. 1908.

Near *C. Wightiana*; but differs from it in having much smaller leaves with elevated veins.

Cinnamomum Burman.

Cinnamomum randaiense Hayata sp. nov. Rami et ramuli nigricantes pubescentes, divaricati. Folia subopposita petiolata oblonga vel oblongo-lanceolata 7½ cm. longa 2½ cm. lata apice acuminata, (acuminibus 1 cm. longis apice obtusis), basi acuta, supra nitida, subtus adpresse villoso-pubescentia, 3-nervia, nervis lateralibus prope basin 1 ramum exteriore emittentibus, venis secundariis transversis obscuris, nervis et venis supra impressis subtus prominente elevatis, coriacea, petiolis 7 mm. longis supra sulcatis. Flores ad apicem ramorum cymose paniculati, paniculis pauce floratis. Perianthium campanulatum pauce pubescens 3½ mm. longum, tubo breve, segmentis 6, subæqualibus obovatis, apice obtusis, 3 mm. longis, 1¾ mm. latis. Stamina perfecta 9, basi segmenti affixa, 1½ mm. longa, ordinis primarii et secundarii eglandulosa, antheris oblongis 1 mm. longis introrsum 4-locellatis, ordinis tertii filamentis utrinque glandula stipitata auctis, stipitibus filamentis connatis, antheris extrorsum 4-locellatis; staminodia ordinis quarti 1 mm. longa, staminibus 3-plo breviora, capitellata, capitulis sagittatis breviter stipitatis. Ovarium sessile ovoideum 1 mm.

longum, stylo 1½ mm. longo validiusculo, stigmate incrassato, obscure 3-lobo.

Hab. in monte Randaizan, leg. B. Hayata et U. Mori, Aug. 1908, (No. 7017).

Very like *Cinnamomum Doederleinii* Engl., but quite distinguishable by oblong or oblongo-lanceolate or ovately lanceolate leaves which are villose in younger stages. In *C. Doederleinii* Engl. the leaves are obovate or obovately lanceolate and glaucous, but not villose even in the young shoots. Also near *Cinnamomum impressinervium* Meissn.; from which this differs by the much smaller flowers.

Cinnamomum reticulatum Hayata sp. nov. Ramuli rugosi rubescentes glabri divaricati. Folia subopposita, vel alterna, petiolata, obovata, 5 cm. longa, 2½ cm. lata, apice obtusa, basi in petiolum 13 mm. longum attenuata, supra nitida, subtus glaucescentia 2-nervia, utrinque pagine venis et venulis prominentibus, minute reticulateque elevatis, venis primariis inconspicuis margine integerrima nervo marginali marginata. Cymæ axillares racemosæ, paucifloratæ, 5 cm. longæ. Perianthium 6-partitum, segmentis subæqualibus ovatis, 3½ mm. longis, obtusis, 5-nerviis extus pauce albo-punctatis intus adpresse pubescentibus. Stamina 9, perfecta, 3 mm. longa, subæquilonga, ordinis primarii et secundarii eglandulosa, spathulata, ordinis tertii utraque glandula sessili medio filamentorum instructa, glandulis ovatis 1 mm. longis; staminodia ordinis quarti sagittata 2½ mm. longa, stipitata. Ovarium immersum, stylo validiusculo 3 mm. longo, stigmate dilatato infundibulari-concavo. Bacca oblonga 1 cm. longa, 7 mm. lata, perianthii tubo explanato parum aucto truncato insidens, segmentis perianthii a basi deciduis.

HAB. Kōshūn : Garanbi, leg. G. NAKAHARA, Dec. 1906, (No. 851) ; ibidem leg. S. KUSANO, 1909.

Machilus NEES.

Machilus (§ *Notaphœbe**) **Konishii** HAYATA sp. nov. Rami longitudinaliter rugosi, fusco-rubescentes, cicatricibus rotundatis foliorum notati, lenticellati, ramulis rubro-nigricantibus. Folia alterna petiolata, coriacea oblongo-obovata, vel oblongo-lanceolata, 8 cm. longa, 3 cm. lata, apice cuspidato-acuminata, (acuminibus 1 cm. longis apice obtusis), basi acuta, supra glabra, subtus pubescentia, pinninervia, venis supra impressis, subtus prominentibus, venis primariis utrinque latere 7, a costa angulo 40° egressis, venis secundariis oblique reticulatis. Paniculæ terminales vel axillares, villosæ, ramosæ, ramis divaricatis. Perianthium extus pilosum intus pubescens, tubo breve, limbo 6-partito, segmentis inæqualibus, exterioribus 3 minoribus ovato-angustatis, 3 mm. longis $1\frac{1}{4}$ mm. latis, interioribus 3 majoribus ovatis obtusis 4 mm. longis $2\frac{1}{2}$ mm. latis multinerviis, distincte valvatis. Stamina 9, fauce tubi perianthii affixa, æquilonga, 3 mm. longa, perfecta, filamentis $2\frac{1}{3}$ mm. longis basi pilosis

§ *Notaphœbe*. Flores hermaphroditi, perianthii tubus brevis, limbus 6-partitus, segmentis inæqualibus 2-seriatis distincte valvatis, exterioribus 3 minoribus, interioribus 3 majoribus. Stamina 9, fauce tubi affixa, ordinis primarii et secundarii eglandulosa, ordinis tertii basi utrinque glandula stipitata aucta, antheris ordonis primarii et secundarii introrsum 4-locellatis, locellis 2-superioribus minoribus, 2-inferioribus majoribus, ordonis tertii 4-locellatis, locellis 2-superioribus minoribus introrsum, 2-inferioribus majoribus extrorsum, dehiscentibus ; staminodia ordonis quarti subulata $1\frac{1}{2}$ mm. longa. Ovarium ovoideum tubo perianthii immersum, stylo exserto, stigmate truncato, 1-loculare, 1-ovulatum, ovulis anatropis pendulis. Bacca globosa, perianthio vix aucto, segmentis persistentibus reflexis.—Arbor ? Folia alterna, petiolata, lanceolata. Paniculæ terminales vel axillares.

* The section *Notaphœbe* is near *Ocotea* from which it differs in having entirely different fruit. It differs from *Haasia* in having 4-celled anthers. The present plant has 9 stamens, of which those of the third order have two lower larger extrorse cells and two upper smaller introrse cells. It is, therefore, rather doubtful whether this should be referred to *Perseaceæ*. The staminodes of the fourth order are very small and subulate, the segments of the perianth are rather thin, and the plant does not look like a species of the *Machilus*-allies.

cæterum glabris complanatis, ordinis primarii et secundarii eglandulosa, ordinis tertii baii utrinque glandula aucta, glandulis late reniformibus vel stipitatis, 1 mm. longis complanatis, antheris ordonis primarii et secundarii oblongis 1 mm. longis obtusis, introrsum 4-locellatis, locellis 2-superioribus minoribus 2-inferioribus majoribus, ordonis tertii 4 locellatis, locellis 2-superioribus minoribus introrsum, 2-inferioribus majoribus extrorsum, dehiscentibus. Staminodia ordonis quarti subulata, 1½ mm. longa. Ovarium ovoideum 1 mm. longum, tubo perianthii immersum, stylo exserto, 2 mm. longo, stigmate truncato, 1-loculare, 1-ovulatum, ovulo anatropo pendulo. Bacca globosa 7 mm. longa, perianthio vix aucto segmentis persistentibus reflexis.

Hab. in monte Morrison, ad 7500 ad. alt., leg. T. Kawakami et U. Mori, Oct. 1906, (No. 1949).

Machilus formosana Hayata in Matsum. et Hayata Enum. Pl. Formos. p. 350.

Persea sp. Chekiang, No. 657, (Herb. Hongk.)

Near *M. neurantha* Hemsl. and *M. Sheareri* Hemsl. ; but differs from the former in having much larger leaves, glaucous beneath, with much elevated veins, and from the latter, in having glabrous inflorescence and leaves.

Machilus (§ *Persea*) **Kusanoi** Hayata sp. nov. Rami rubro-cinerascentes longitudinaliter rugulosi, lenticellis elevatis cupuliformibus dispersi, cicatricibus foliorum notati, ramulis apice cicatricibus perularum approximate annulariter notatis glabris. Folia chartaceo-coriacea, oblongo-obovata, vel oblanceolata, 20 cm. longa, 6½ cm. lata, apice acuminata vel cuspidato-acuminata, basi cuneato-acuta, margine integra, utrinque glabra, supra subnitida,

ad costas sulcata, subtus costis prominente venis tenuiter elevatis, venulis minute reticulatis, venis lateralibus 10-14 tenuissimis, mediocribus a costa angulo 50° egressis, costis longitudinaliter rugulosis, petiolis 2½ cm. longis glabris, supra sulcatis, foliis superioribus angustioribus. Paniculæ ad apicem ramorum terminales, circ. 10-cæspitosæ, cum pedunculis 13 cm. longæ, pedunculis 6 cm. longis, glabris, apice ramosis, pedicellis 4 mm. longis. Flores apertientes 4 mm. longi, 9 mm. in diametro. Perianthii segmenta 6 ; 3-exterioribus minoribus oblongo-angustis, extus glabris intus plus minus pubescentibus 3½ mm. longis, 2 mm. latis, apice rotundato-obtusis, margine ciliolatis, obscure 6-nerviis, 3-interioribus majoribus, ovatis 4 mm. longis, 2⅔ mm. latis, apice obtusis margine ciliolatis obscure multinerviis. Stamina 9, æquilonga, filamentis crassiusculis, 2 mm. longis plus minus complanatis, basin plus minus barbatis, ordinis primarii eglandulosa, antheris oblongo-quadrangularibus, 1⅓ mm. longis, introrsum dehiscentibus, 4-locellatis, locellis 2-inferioribus longioribus, 2-superioribus brevioribus, ordinis secundarii basi filamentorum 2-glandulosa, glandulis (formis equi calcei) stipitatis, stipitibus 1⅓ mm. longis, antheris angustioribus 1⅓ mm. longis, 2-locellatis, extrorsum dehiscentibus, filamentis glandulisque basin barbatis, ordinis quarti staminodia complanata ensiformia, apice acuta infra apicem dilatata basi barbata 2½ mm. longa. Ovarium glabrum oblongum 1 mm. longum, stylo columnari, 2 mm. longo, stigmate pectinato-barbato. Paniculæ fructiferæ (T. Kawakami, No. 1323 !) 10 cm. longæ, pauci-ramosæ, fructibus globosis 8 mm. in diametro, perianthiis accrescentibus persistentibus.

Hab. Kōshibussha, S. Kusano, 1909 : Shinkō : Remogan, leg. T. Kawakami ; Nantō : Randaizan, (No. 3456).

Machilus longifolia Blume in Ann. Mus. Bot. Lugd.-Bat. I. p. 331 ; Meissn. in DC. Prodr. XV-1, p. 43 ; Franch. et Savat. Enum. Pl. Jap. p. 412 ; Forbes et Hemsl. Ind. Fl. Sin. II. p. 375.

Hab. Arizan, leg. T. Kawakami et U. Mori, Mart. 1908, (Nos. 6207 et 6209).

My plant is very near Blume's species, but the identification is not very satisfactory.

Machilus macrophylla Hemsl. var. **arisanensis** Hayata n. v. Ramuli glabri, fusco-cinerascentes. Folia alterna, petiolata, lanceolata, 9 cm. longa, 2½ cm. lata, apice acuminata, (acuminibus obtusis), basi acuta vel obtusa, supra glabra subtus glauca, sub microscopio minute lepidota, supra costis venis planis, subtus elevatis, venis primariis utrinque 10, a costa angulo 30 egressis, prope marginem anastomosantibus evanescentibus, venis secundariis et venulis utrinque pagine minute reticulatis, margine integerrima, vix revoluta, coriacea patente cernua, petiolis 1 cm. longis. Flores paniculati, paniculis versus apicem ramorum alternatim dispositis, basi perulatis, perulis caducissimis. Paniculæ 6 cm. longæ, sursum floriferæ, ramis 2 cm. longis, divaricatis, pedicellis 1 cm. longis, glabris. Perianthium glabrum, 6-partitum, segmentis ovatis 5½ mm. longis, 3½ mm. latis, apice rotundatis, 7-nerviis. Stamina 9, subæqualia, 4½ mm. longa, filamentis glabris, ordonis primarii et secundarii eglandulosa, ordonis tertii utrinque glandula stipitata aucta, antheris oblongis 1½ mm. longis, ordinis primarii et secundarii introrsum, ordinis tertii laterale extrorsum, 4-locellatis ; ordinis quarti staminodia ensiformia complanata, 1½ mm. longa. Ovarium globosum 1¼ mm. longum, stylo filiformi 3 mm. longo.

Hab. Arizan, in montibus Morrison, leg. T. Kawakami et U. Mori, Mart. 1908, (Nos. 6215 et 3681).

Very near *Machilus macrophylla* HEMSL. in FORBES et HEMSL. Ind. Fl. Sin. II. p. 377, and HENRY's Herb. No. 5699, from which the present variety differs in having larger flowers and shorter and fewer flowered inflorescens. Also near *Machilus chinensis* HEMSL., but differs from it in having a little broader perianth-segments, and more narrower acuminate leaves.

Machilus Thunbergii SIEB. et ZUCC. Fl. Jap. Fam. Nat. II. No. 704 ; MEISSN. in DC. Prodr. XV.-1, p. 42 ; FORBES et HEMSL. Ind. Fl. Sin. II. p. 377 ; MATSUM. et HAYATA Enum. Pl. Formos. p. 351.

HAB. Kashitō, leg. G. NAKAHARA, Feb. 1906, (Nos. 1039 et 1040) ; Kōtōshō, leg. T. KAWAKAMI et U. MORI, 1907, Aprili. (No. 2454) ; Liukiu : Nago, leg. G. NAKAHARA, 1907, Aprili.

Machilus (*Persea*) **zuihœnsis** HAYATA sp. nov. Rami longitudinaliter rugosi, rubro-nigricantes. Folia alterna petiolata, oblanceolata, vel longe oblonga, 8 cm. longa, $2\frac{1}{2}$ cm. lata, apice obtusa, basi acuta, supra costis et venis planis subtus leviter elevatis, supra glabra, subtus sub lente minutissime lepidota, adpresse et tenuiter pubescentia, venis primariis utrinque latere 7-8 rectis a costa angulo 50° egressis, venulis indistinctis, petiolis 1 cm. longis. Flores cymoso-paniculati, paniculis ad apicem ramulorum alternatim approximatim dispositis, gracilibus circ. 10 cm. longis sursum floriferis basi perulatis, perulis obovatis, rotundatis 8 mm. longis, deciduis, floribus ad apicem ramorum panicularum ternatim dispositis, ramis panicularum brevibus 7 mm. longis, pedicellis 1-2 mm. longis pubescentibus. Perianthium extus pubescens, tubo brevissimo, limbo 6-partito, segmentis subæqualibus obovatis $4\frac{1}{2}$ mm. longis, 2 mm. latis apice rotundatis. Stamina 9, æquilonga, 4 mm. longa, filamentis complanatis $2\frac{1}{3}$ mm. longis glabris, ordinis pri-

marii et secundarii eglandulosa, antheris oblongis introrsum 4-locellatis, ordinis tertii utrinque glandula stipitata aucta, stipitibus 1 mm. longis, antheris 4-locellatis, locellis laterale extrorsum dehiscentibus; ordinis quarti staminodia ensiformia 1½ mm. longa intus basi barbata. Ovarium globosum 1⅓ mm. longum, stylo 2 mm. longo, filiformi, stigmate dilatato, pectinato circ. 3-lobato.

Hab. Kelung: Zuihō, leg. T. Kawakami, Mart. 1907, (No. 4241).

Near *Machilus Nanmu* Hemsl., but differs from it by the more obtuse leaves with different venation.

Litsea Lam.

Litsea akœnsis Hayata sp. nov. Rami fusco-cinerascentes, longitudinaliter rugosi, cicatricibus foliorum notati, ramulis dense fusco-pubescentibus. Folia alterna, petiolata, oblongo-obovata, 8½ cm. longa, 3 cm. lata, apice obtusa, basi cuneata, ima basi obtusa, supra glabrata, ad costas basi pubescentia, subtus minute lepidota ad nervos hirtellato-pubescentia, fusco-glaucescentia, supra costis venis venulisque impressis subtus prominente elevatis, venis primariis utraque latere 5-7, a costa angulo 50° egressis arcuatis prope marginem evanescentibus, venis secundariis oblique transversis, venulis reticulatis, petiolis 1 cm. longis. Fl. ♀: umbellatim cymosi, cymis axillaribus, ramis divaricatis, umbellis 4-5-floratis, floribus subsessilibus vel breve pedicellatis, pedicellis 1 mm. longis, sericeo-pubescentibus, bracteis involucri globosis extus sericeo-pubescentibus, margine ciliatis 6 mm. longis. Perianthium campanulatum 3 mm. longum, tubo intus sericeo, 1½ mm. longo, limbo 6-partito, lobis subæqualibus, ovatis, 1½ mm. longis vel acutis vel cuspidato-

acutis. Staminodia 9-12, linearia vel subulata, 1½ mm. longa, barbata, intimis 2-glandulosis. Ovarium obovatum 1¼ mm. longum, apice in stylum 2½ mm. longum attenuatum, stigmate discoideo, 2-3-lobato. Bacca oblonga 1 cm. longa, 6 mm. lata, calycis tubo accrescente cupuliformi insidens, segmentis calycis deciduis.

HAB. Akō : Tanashū, leg. G. NAKAHARA, Jan. 1906 ; Botansha, leg. S. KUSANO, Jan. 1909, (sp. ♀.)

Here is another specimen bearing male flowers which resembles very much the species just described, and may be the partner of it. The following description is drawn from the male specimen.

Folia obovata vel obovato-oblonga, 13 cm. longa, 6 cm. lata apice breve acuta, basi cuneata. Fl. ♂ : umbellæ 3-4-floratæ, breve pedicellatæ, pedicellis 1 mm. longis, pubescentibus. Perianthium extus pubescens, 6-7-8 partitum, segmentis obovatis 4½ mm. longis, 2½ mm. latis. Stamina circ. 16, subæqualia, 5 mm. longa, exserta, filamentis barbatis exterioribus irregulariter glandulosis. Rudimentum ovarii minutum.

HAB. in monte Morrison, ad 7500 ped. alt., leg. T. KAWAKAMI et U. MORI, 1906, Oct. (No. 1706, sp. ♂.)

Litsea (*Tetradenia*) **aurata** HAYATA sp. nov. Rami cinerascentes, rugosi, lenticellati, cicatricibus foliorum notati, ramulis fuscentibus glabris. Folia persistentia coriacea alterna ad apicem ramorum verticillatim approximatim superposita, petiolata oblonga, 8 cm. longa, 32 mm. lata, apice acute obtusa basi obtusa, utrinque venis elevatis, supra glabra, subtus pilis adpressis sericeo-aurata, 3-nervia, venis primariis utrinque 2-3, venis secundariis transverse reticulatis. Umbellæ florum secus apicem ramulorum approximate dispositæ, sessiles, (bracteis involucri 4, globosis deciduis 5 mm.

longis), 5-10-floratæ, solitariæ vel 2-3 congestæ, floribus pubescentibus, pedicellatis, pedicellis 3 mm. longis. Perianthii tubus campanulatus brevis, 1 mm. longus, limbus 4-partitus, segmentis ovatis 4 mm. longis 2 mm. latis, extus margine pubescentibus, intus glabris. Stamina 6-7, æquilonga, 4 mm. longa, exserta, filamentis filiformibus, basi hirsutis, ordinis primarii eglandulosa, ordinis secundarii glandula stipitata utrinque aucta, antheris ovatis $1\frac{1}{2}$ mm. longis connectivo vix producto, 4-locellatis, locellis 2-superioribus introrsum, 2-inferioribus laterale vel extrorsum dehiscentibus. Ovarium globosum $\frac{3}{4}$ mm. longum, stylo validiusculo, $1\frac{1}{2}$ mm. longo, patente hirsuto, stigmate 3-lobato, lobis pectinatis.

Hab. Kōtōshō, leg. K. Miyake, Nov. 1899, (Fl. ♂); ibidem leg. G. Nakahara, Feb. 1906, (No. 1045).

Litsea citrata Blume; Hook. f. Fl. Brit. Ind. V. p. 155; Forbes et Hemsl. Ind. Fl. Sin. II. p. 379.

Hab. Nantō: Nankōkei, leg. U. Mori, Aug. 1906, (No. 1164); Horisha, leg. Y. Shimada, Feb. 1907, (No. 4233); Bunbunsha, leg. U. Mori, Juli. 1907, (No. 3171); Hinokiyama, leg. G. Nakahara, Feb. 1907; Nantō: Bigenzan, leg. U. Mori, Juli. 1907, (No. 3184); Randaizan, leg. B. Hayata et U. Mori, Aug. 1908, (No. 7009); ibidem, leg. S. Kusano, 1909; Hsinchū, leg. Hiraoka; Shintiku: Daihei, leg. Y. Shimada, Sept. 1907, (No. 4690); Taitō: Bunshiseki, leg. U. Mori, Dec. 1906, (No. 2218); in monte Morrison, leg. T. Kawakami et U. Mori, Oct. 1906, (No. 2053); Shintiku: Goshizan, leg. T. Kawakami, Dec. 1905, (No. 1310); Mt. Chōron, leg. G. Nakahara, Aug. 1905; Akō: Daijoringe, leg. U. Mori, Aprili. 1907, (No. 2893); Tōyen, leg. T. Kawakami et U. Mori, Mart. 1907, (No. 2656); Uraisha, leg. N. Konishi, Mart. 1907, (No. 33).

Distrib. China, Eastern India, Birma and Java.

Observ. Rami glabri nigricantes, ramulis gracilibus. Folia alterna, petiolata, subpersistentia membranacea lanceolata, 7 cm. longa, 16 mm. lata, apice acuminata, basi acuta, vel obtusa, costis et venis utrinque paullum elevatis, venis primariis gracillimis, petiolis 8 mm. longis. Umbellæ florum racemose dispositæ, racemis axillaribus 1½ cm. longis, pedicellis umbellarum 8 mm. longis, vel racemis in 1 umbellam reductis. Umbellæ 4-floratæ, basi bracteis 4, persistentibus, globosis 4 mm. longis, 5-nervatis, apice rotundatis membranaceis glabris. Perianthium 6-partitum glabrum, segmentis late ovatis obtusis 2 mm. longis, 1½ mm. latis, integris vel denticulatis. Stamina 9, omnia perfecta, 2 mm. longa, segmento perianthii æqualia, filamentis glabris linearibus, ordinis primarii et secundarii eglandulosa, ordinis tertii glandula breve stipitata utrinque aucta, antheris omnibus introrsum 4-locellatis. Rudimentum ovarii minutum. Fl. ♀ : ignoti. Bacca globosa, nigricans 5 mm. longa, perianthii tubo non accrescente insidens, segmentis calycis deciduis.

As shown in the above list, the species is widely distributed in Formosa.

Litsea (*Tetradenia*) **Konishii** Hayata sp. nov. Ramuli recti, fusco-nigricantes, glabri, parce lenticellati, ad nodos cicatricibus foliorum approximate notati. Folia persistentia, coriacea, ad apicem ramulorum approximate verticillatim disposita, alterna, petiolata lanceolata vel oblonga, 14 cm. longa, 4½ cm. lata, apice abrupte acuminata, (acuminibus brevibus obtusis), basi gradatim acuta, supra glabra, subtus glauca, pilis longis adpressis parce obtecta, demum glabrata, supra basin trinervia, venis primariis paucis utrinque latere 3, venis secundariis transverse reticulatis,

petiolis 1 cm. longis. Alabastrum foliorum elongatum cylindricum, 4½ cm. longum, 8 mm. latum, perulis ∞-seriatis, intimis spathulatis exterioribus gradatim brevioribus, extimis minutissimis, extus adpresse sericeo-pubescentibus. Umbellæ florum secus apicem ramulorum aggregatim dispositæ, sessiles 5-6-floratæ, bracteis involucri 4, globosis, 5 mm. longis, floribus pedicellatis, pedicellis 4 mm. longis pubescentibus. Perianthium 4-partitum, extus pilosum, segmentis ovato-lanceolatis 4 mm. longis. Stamina 6, dimera, 3-seriata, omnia perfecta, exserta, 5½ mm. longa, antheris 4-locellatis, 2-superioribus introrsum, 2-inferioribus extrorsum, dehiscentibus, filamentis filiformibus, basi hirsutis, ordonis primarii et secundarii eglandulosa, ordonis tertii glandula stipitata utrinque aucta. Rudimentum ovarii O. Bacca ovoidea, apice acuta, nuda, lobo perianthii deciduo.

Hab. Nantō: Hinokiyama, leg. T. Kawakami et U. Mori, Juli. 1907, (No. 3167); Randaizan, leg. T. Kawakami et U. Mori, Juli. 1907 (No. 3317); Shintiku: Goshizan, Dec. 1905, (No. 1290); Risekizan, Jan. 1908, (No. 4543); Uraisha, leg. N. Konishi, Mart. 1908, (No. 92); Murimuribussha, prope Pinan, leg. K. Miyake, Dec. 1899; Hokkōkei, leg. C. Owatari, Jan. 1898.

Near *Tetradenia glauca* Matsum.=*Litsea glauca Sieb.* from which the present plant differs in having oblanceolate leaves which are broadest in the upper parts of the blade. In *T. glauca*, the leaves are broadest in the lower parts of the blade.

Litsea lancifolia Villar; Forbes et Hemsl. Ind. Fl. Sin. II. p. 382; Matsum. et. Hayata Enum. Pl. Formos. p. 352.

Hab. Ginai, leg. K. Miyake, Sept. 1899, Fl. ♀.

Distrib. Japan.

This is exactly the same as the Japanese plant.

Litsea morrisonensis HAYATA sp. nov. Ramuli graciles, cinereo-rubescentes, glabri. Folia alterna, petiolata, oblanceolata, 11½ cm. longa, 2½ cm. lata, apice obtuse acuminata, basi obtuse acuta, integra vel obscure crenulata, supra costis impressis venis et venulis inconspicuis venulis minute reticulatis, subnitida, subtus costis et venis primariis et secundariis prominentibus ad venas et venulas hirtella, venis primariis utraque latere 12, a costa angulo 60° egressis arcuatis prope marginem evanescentibus subtus glaucissima, petiolis 1 cm. longis. Flores 5-6 umbellatim dispositi, umbellis pedunculatis, ad axillas foliorum superiorum, pedunculis 2 cm. longis, bracteis involucri 3, inæqualibus persistentibus orbicularibus membranaceis ½ cm. longis, florem amplectantibus, pedicellis brevibus 1½ mm. longis. Fl. ♂: perianthii tubus brevissimus, segmentis 3-4, oblongis, extus pubescentibus, 2½ mm. longis. Stamina perfecta 9, longe exserta, subæquilonga 4½ mm. longa, ordonis primarii et secundarii introrsum 4-locellata, ordonis tertii locellis inferioribus lateralibus, basin utraque latere glandula stipitata instructa, stipitibus basin filamento connatis, filamentis hirtellatis. Staminodia ordonis quarti 0. Rudimentum ovarii nullum. Fl. ♀: ignoti.

HAB. in monte Morrison, ad 9000 ped. alt., leg. T. KAWAKAMI et U. MORI, Oct. 1906, (No. 1955).

Litsea mushænsis HAYATA sp. nov. Rami fusco-rubescentes, lenticellis globosis notati, ramulis petiolisque dense pubescentibus. Folia alterna petiolata, obovato-lanceolata, oblanceolata, vel oblonga, 12½ cm. longa 4 cm. lata, apice breve acuminata, basi angustata, vel cuneata, supra subglabrata, ad costas tenuiter hispidula, subtus ad costas venas et venulas dense hirsuta, costis et venis supra impressis vel planis, subtus prominente elevatis,

venis primariis utrinque latere 7, a costa angulo 40° egressis, apice arcuatis prope marginem evanescentibus, venis secundariis transversis, venulis reticulatis, subtus pallido-fuscentia. Flores umbellati, umbellis secus apicem ramulorum dispositis. Alabastrum umbellarum globosum a bracteis sericeo-pubescentibus inclusum, pedunculis 1 cm. longis. Flores perfecti ignoti.

Hab. Nantō: Mushazan, leg. T. Kawakami et U. Mori, Aug. 1906, (No. 1142).

Near *Litsea elongata* Hook. f., but differs from it by the oblanceolate leaves with a more cuneate base.

Litsea nantœnsis Hayata sp. nov. Rami recti graciles fusco-rubescentes, glabri, longitudinaliter rugosi, cicatricibus foliorum oblongis remote notati. Folia alterna petiolata, lanceolata, apice acuminata, basi acuta, costis supra sulcatis subtus elevatis venis primariis supra planis subtus prominentibus, utrinque latere 12, apice arcuatis, prope marginem evanescentibus, a costa angulo 60 egressis, venis secundariis reticulatis, supra glabra subtus glaucissima, petiolis 1½ cm. longis. Flores umbellati, umbellis 2-3 ad apicem pedunculorum dispositi, pedunculis 1 cm. longis ad axillas foliorum soritariis. Umbellæ 3-4-floratæ, bracteis 4-5, globosis 4 mm. longis, pubescentibus alabastrum florum includentibus, pedicellis 2 mm. longis pubescentibus. Perianthii tubus brevis hirsutus, limbus 6-partitus, segmentis oblongis 2-2½ mm. longis obtusis. Stamina 9, omnia perfecta, æquilonga, exserta, 4 mm. longa, antheris omnibus introrsum 4-locellatis, filamentis filiformibus basi barbatis, ordonis primarii et secundarii eglandulosa, ordonis tertii glandula sessili utrinque aucta.

Hab. Nantō: Risekizan, leg. U. Mori, Juli. 1906, (No. 3242).

Near *Litsea acuminata* (Meissn.) Makino, from which the present

plant differs in having leaves which have primary veins diverging from the midrib in a more obtuse angle, and in the male inflorescence which is much looser and smaller. Also near *Litsea hupehana* HEMSL. but differs by the venation of the leaves.

Litsea obovata HAYATA sp. nov. Ramuli dense breveque tomentosi fusco-rubescentes. Folia alterna, petiolata, obovata, vel late oblonga, 13 cm. longa, 8 cm. lata, apice rotundato-acuta, basi acuta supra glabrata, ad costas pubescentia, subtus ad costas venas venulasque hirtellata, ad paginam minute lepidota, pallidissima, costis et venis supra impressis subtus prominente elevatis venis primariis utrinque latere 6-7, a costa angulo 60° egressis arcuatis apice 2-furcatis prope marginem anastomosantibus, venis secundariis oblique transversis, venulis reticulatis, petiolis 1½ cm. longis. Umbellæ florum cymosæ, cymis axillaribus. Involucrum alabastri globosum. Fl. perfecti non visi.

HAB. Banchōryō, leg. T. KAWAKAMI et U. MORI, Nov. 1907, (No. 4143).

Near *L. tomentosa*, but differs from it by the much less hairly and obovate leaves.

Lindera THUNB.

Lindera akœnsis HAYATA sp. nov. Rami fusco-cinerascentes, longitudinaliter rugosi, cicatricibus foliorum elevatis notati, ramulis gracilibus fusco-pubescentibus. Dicœca. Pl. ♂ : Folia alterna petiolata, ovata, vel oblonga, 4 cm. longa, 23 mm. lata apice abrupte acuta, basi acuta, supra nitida, subtus glauca, ad costas venas venulasque hirtellata, venulis reticulatis utrinque pagine elevatis, petiolis 5 mm. longis, supra sulcatis. Flores 5-6 ad axillas foliorum congesti, pedicellis brevibus 2 mm. longis pubescentibus, perulis

globosis 3 mm. longis caducissimis. Perianthium extus basi pauce pubescens, 6-partitum, segmentis late ovatis, 2 mm. longis, $1\frac{3}{4}$ mm. latis, obtusis. Stamina 9, omnia perfecta, perianthio æquilonga, introrsum 2-locellata, antheris 1 mm. longis, ovatis connectivis apice productis, ordonis primarii et secundarii eglandulosa, ordonis tertii basi glandula subsessili utrinque aucta. Rudimentum ovarii minutum obovatum, $\frac{3}{4}$ mm. longum in stylum $1\frac{1}{2}$ mm. longum attenuatum. Pl. ♀ : Folia late ovata 5 cm. longa, $3\frac{1}{2}$ cm. lata apice abrupte acuta, basi acuta vel truncato-acuta, vel rotundato-acuta, supra nitida, subtus glauca, venis et venulis hirtellatis, venis primariis utrinque 5, a costa angulo 60° egressis, venulis reticulatis utrinque elevatis. Flores ad axillas 5-6 congesti, pedicellis sericeo-pubescentibus 1-3 mm. longis. Perianthium campanulatum, $2\frac{1}{2}$ mm. longum, tubo 1 mm. longo, limbo 6-lobato, lobis rotundato-triangularibus, obtusis $1\frac{1}{2}$ mm. longis. Staminodia 9 in fauce tubi perianthii affixa minuta linearia 1 mm. longa, ordonis tertii basi glandula sessili utrinque aucta. Ovarium obovoideum 2 mm. longum, in stylum $1\frac{1}{2}$ mm. longum attenuatum, stigmate dilatato lobato.

Hab. Tōshiyen, shinkōsha, leg. U. Mori, Mart. 1907, (No. 2794, ♂); Taitō : Tamari, leg. U. Mori, Aprili. 1907 ; Akō : Tanashū, leg. G. Nakahara, Jan. 1906 ; Akō : Ryokusha, leg. T. Kawakami et U. Mori, Aprili. 1907, (No. 3147) ; Takaw, (No. 6324); Banchoryō, leg. U. Mori, Nov. 1908 ; Akō : Bongari, leg. G. Nakahara, Sept. 1905, (Nos. 516, et 3809).

Near *L. præcox* Blume, but differs from it in having flowers together with full foliage. The leaves of this plant are usually thicker and smaller. The description of the male plant is drawn up from a specimen numbered 2794, and that of the female, from a specimen numbered 2884. There exists some slight difference

between the two specimens in the shape of leaves. I think, however, from the general appearance of the plant, that one may be the partner of the other, and therefore I have here described them under the same name. In case that they should not be of the same species, the present name should be used for the male plant. To prevent a confusion of nomenclature, which may have crept in from such an error, I have here given the descriptions of the male and female separately.

Lindera communis Hemsl. in Forbes et Hemsl. Ind. Fl. Sin. II. p. 387.

Hab. Uraisha, leg. N. Konishi, Aprili. 1908, (No. 69), (No. 93 ♀) ; Nantō : Suisha, leg. N. Konishi, Feb. 1907, (Fl. ♂).

Distrib. China : Hupeh, Szechuen, Kwangtung.

Observ. Ramuli fusco-cinerascentes, longitudinaliter rugosi, cicatricibus basi elevatis foliorum notati, ramulis fuscentibus breve villosis. Folia persistentia alterna petiolata, oblonga, 8 cm. longa, 23 mm. lata, apice acuminata, basi acuta, (acuminibus 13 mm. longis apice obtusis), supra glabra, subtus breve tomentosa, costis et venis supra leviter impressis, subtus prominente elevatis venis primariis utrinque latere 5, a costa angulo 40° egressis, prope marginem arcuatis, anastomosantibus, venis secundariis transverse reticulatis, petiolis 7 mm. longis hirsutis. Flores umbellatim 5-6 ad axillas foliorum dispositi, perulis caducis globocis 5 mm. longis, extus basi sericeo-pubescentibus. Flores perfecti non visi. Bacca globosa, 5 mm. longa apice breve apiculata, 5-6 umbellatim ad axillas foliorum disposita, pedicellis 1 cm. longis, pubescentibus, perianthii tubo explanato parum aucto 6-lobo insidens, lobis a basi deciduis.

My plant is very like *Lindera communis* Hemsl. It is a little

different from HENRY's herb. No. 4574, in having villosely pubescent branchlets, longer pedicels, larger receptacle, leaves which are more hairy beneath, and in many other points. The leaves of HENRY's specimen are rather reddish brown when dried; but those of my plant are never reddish but dark brown or pale brown.

Lindera formosana HAYATA sp. nov.

Litsea lancifolia HAYATA in MATSUM. et HAYATA Enum. Pl. Formos. p. 352, pro parte, (non VILLAR).

Rami rubro-cinerascentes, cicatricibus elevatis foliorum deciduorum notati, ramulis cinerascentibus breve pubescentibus. Folia secundum in annum virentia, alterna, petiolata, obovato-oblonga, 6 cm, longa, 2 ½cm. lata, apice abrupte acuminata, (acuminibus 7 mm. longis apice obtusis), basi acuta, integra supra glabra, subtus glauca, ad venas venulas hirtella, venis primariis utrinque 5, a costa angulo 50° egressis, venulis transverse reticulatis, costis et venis supra impressis, subtus prominente elevatis, petiolis 8 mm. longis. Flores umbellatim 5-6 ad axillares foliorum (annotinorum) fasciculati, pedicellis 4 mm. longis pubescentibus. Perulæ alabastri caducæ orbiculares 5 mm. longæ, extus basi pubescentes. Fl. ♂ : perianthium glabrum 6-partitum, segmentis ovatis, 3 mm. longis, 2 mm. latis, apice rotundatis. Stamina 9, omnia perfecta, 2 mm. longa, segmentis perianthii breviora, introrsum 2-locellata, ordonis primarii et secundarii eglandulosa, ordonis tertii basi utrinque glandula aucta. Rudimentum ovarii minutum cum stylo 1½ mm. longum.

HAB. Chōkachiraisha, Kachinro, leg. C. OWATARI, Mart. 1898.

Lindera glauca BLUME var. **Kawakamii** HAYATA n. v. Rami albo-cinerascentes, ramulis gracilibus. Folia hysterantha decidua, (novella) alterna, petiolata, oblonga, 3 cm. longa 13 mm. lata,

utrinque acuta, utraque sericeo-pubescentia, venis primariis arcuatis ramosis anastomosantibus, petiolis 2 mm. longis. Flores fasciculati, fasciculis ad cicatricibus foliorum (annotinorum) axillaribus, 5-10-floratis, pedicellis 5-7 mm. longis, pubescentibus, bracteis linearibus 6 mm. longis $\frac{1}{2}$ mm. latis, extus sericeo-villosis, intus glabris, perulis basi fasciculorum caducis rubescentibus orbicularibus 1 cm. longis. Fl. ♂ : perianthium 6 partitum, segmentis oblongis 3 mm. longis, $1\frac{3}{4}$ mm. latis, apice rotundatis vel leviter emarginatis. Stamina 9, 2 mm. longa, perianthium non excedentia, perfecta, omnia introrsum 2-locellata, ordoni primarii et secundarii eglandulosa filamentis complanatis $1\frac{1}{2}$ mm. longis, ordonis tertii utrinque basi filamentorum glandula subsessili aucta, antheris omnibus oblongis apice emarginatis. Rudimentum ovarii minutum oblongum 1 mm. longum, stylo brevi.

HAB. Taikōkei, leg. T. KAWAKAMI, Dec. 1906, (No. 1071) ; Akō : leg. T. KAWAKAMI et U. MORI, Aprili. 1907, (No. 2898).

Lindera Oldhami HEMSL. in FORBES et HEMSL. Ind. Fl. Sin. II. p. 390 ; MATSUM. et HAYATA Enum. Pl. Formos. p. 353.

HAB. Shintiku : Shinho, leg. Y. SHIMADA, Oct. 1907, (No. 5688, Fr.)

DISTRIB. An endemic plant.

OBSERV. Ramuli validi fusco-nigricantes (in exsiccato) longitudinaliter rugosi, cicatricibus foliorum orbicularibus et iis pedunculorum planis notati. Folia parte persistentia alterna, petiolata, oblonga, vel oblongo-lanceolata, $15\frac{1}{2}$ cm. longa, 5 cm. lata, apice acuminata, basi acuta integra, supra glabra, subtus glauco-pallida, pubescentia, costis supra impressis subtus prominente elevatis, venis supra leviter subtus prominente elevatis, venulis reticulatis utrinque pagine elevatis, venis primariis utrinque latere 11, ad

costa angulo 40° egressis sursum arcuatis prope marginem evanescentibus, venis secundariis oblique vel transversim reticulatis, membranacea, petiolis 2 cm. longis. Alabastrum foliorum elongatum cylindricum, perulis albo-sericeis ovatis vel oblongis. Flores circ. 20 umbellati, umbellis pedunculatis, pedunculis 1½ cm. longis axillaribus solitariis, bracteis basi umbellarum magnis coriaceis concavis alabastrum floris amplectantibus, globosis extus breve pubescentibus, margine ciliolatis. Fl. ♂ : pedicellis 1 cm. longis, pubescentibus; perianthium extus parce pubescens 6-partitum, segmentis obovatis vel spathulatis 4½ mm. longis, 2½ mm. latis, apice rotundatis. Stamina 9, segmentis periathii longiora, 6 mm. longa, omnia introrsum 2-locellata, filamentis hirsutis, antheris late ovatis, apice connectivo apiculatis, ordinis primarii et secundarii eglandulosa, ordinis tertii glandula stipitata utrinque aucta, stipitibus filamento basi connatis. Rudimentum ovarii minutum apice stylo punctatum. Bacca oblongo-globosa perianthii tubo accrescente segmentis deciduis insidens, pedicellata, 5-6 umbellata, umbellis pedunculatis, pedunculis 1½ cm. longis, pedicellis 1 cm. longis omnibus pubescentibus.

Near *Lindera megaphylla* Hemsl. in Ind. Fl. Sin. II. p. 389, and Henry's herb. No. 3345, but greatly differs from it in having broader leaves which are widest in the middle portion. The stamens of the third order are neither entrorse nor extrorse, but exactly lateral, and it is rather questionable whether the plant should be referred to the tribe *Litseaceæ* or *Perseaceæ*.

Lindera randaiensis Hayata sp. nov. Rami et ramuli validi, glabri, in exsiccato rubro-nigricantes, lenticellati, cicatricibus semilunatis foliorum approximate notati. Folia decidua alterna, petiolata, rhomboideo-ovata, 16 cm. longa, 7½ cm. lata, utrinque

acuta, subtus glauca, costis venisque prominentibus, venis primariis utrinque latere 7-8, venis prope basin margine inferiore parallelis, a costa angulo 40 egressis, petiolis 4 cm. longis. Flores racemosi, racemis 3 cm. longis 5-6 umbellatim ad apicem ramorum dispositis. Perulæ alabastri floris 3-4, orbiculares $1\frac{1}{2}$ cm. longæ, extus breve pubescentes, persistentes, bracteis racemorum filiformi-linearibus 1 cm. longis barbatis, pedicellis 6 mm. longis. Fl. ♂ : perianthium basi barbatum 6-partitum, segmentis linearibus 4 mm. longis, $1\frac{1}{4}$ mm. latis. Stamina 9, segmento perianthii 2-plo breviora, filamentis complanatis basi barbatis, ordinis primarii et secundarii eglandulosa, introrsum 2-locellata, ordinis tertii utrinque basi filamentorum glandula sessili aucta introrsum 2-locellata vel abortu in staminodium reducta. Rudimentum ovarii obovatum 1 mm. longum, stylo breve 1 mm. longo, stigmate dilatato. Flores ♀ : ignoti.

Hab. Mt. Randaizan, leg. S. Kusano, 1908.

The description of the leaves of the present plant is drawn up from the material collected by Mr. S. Kusano, who carefully gathered fallen leaves on the spot where this tree stands.

Hernandiaceæ.

Illigera Blume.

Illigera luzonensis (Presl.) Merrill in Philip. Journ. Sci. III. Suppl. p. 407.

Hab. Kōshūn : Botansha, leg. G. Nakahara, Dec. 1906.

Distrib. Philippines.

Proteaceæ.

Helicia Lour.

Helicia cochinchinensis Lour.; Matsum. et Hayata Enum. Pl. Formos. p. 354.

Hab. Daitōsei, leg. T. Kawakami et U. Mori, 1908, Juli. (No. 1088).

Thymelæaceæ.

Daphne Linn.

Daphne Genkwa Sieb. et Zucc. Fl. Jap. I. p. 137, t. 75; Meissn. in DC. Prodr. XIV. p. 531; Maxim. in Mél. Biol. XI. p. 310; Franch. et Savat. Enum. Pl. Jap. I. p. 404; Franchet Pl. David. p. 259, (var. *Fortunei*); Forbes et Hemsl. Ind. Fl. Sin. II. p. 395.

Daphne Championi Hayata Fl. Mont. Formos. p. 355, (non Benth.).

Distrib. China: Shantung, Chekiang, Kiangsi, Fokien, Hupeh, Shensi.

Elæagnaceæ.

Elæagnus Linn.

Elæagnus morrisonensis Hayata sp. nov.

Elæagnus umbellata Hayata Fl. Mont. Formos. p. 190, (non Thunb.). Rami graciles, ut videntur scandentes, dense vel parce ferrugineo-lepidoti. Folia oblongo-ovata, vel oblongo-lanceolata, 8 cm. longa, 3 cm. lata, apice acuminata, obtusa, basi obtusa, vel

rotundato-obtusa, margine repandato-integra, supra subglabra, vel parcissime lepidota, subtus densissime lepidota, albicantia, lepis ferrugineis parce dispersa, chartacea, supra costis subsulcatis vel subplanis, subtus prominentibus, venis lateralibus primariis subtus tenuiter elevatis utrinque 10-12, rectis tenuissimis, a costa angulo 50° egressis. Flores ad axillas foliorum 3-4-fasciculati, vel brevissime racemosi, basi perulati, perulis minutis ferrugineo-lepidotis, pedecellis 3-4 mm. longis. Perianthium infundibuliforme, 1 cm. longum, extus densissime albo-lepidotum, etiamque lepidibus ferrugineis parce dispersum, intus atro-fuscente, tubo oblongo 2 mm. longo, ad faucem constricto, supra constrictionem dilatato, limbo infundibuliformi, 8 mm. longo, basi tubuliformi, apice dilatato, partibus tubuliformibus 4 mm. longis, circ. 2 mm. in sectione, partibus dilatatis 4 mm. longis, 5 mm. in diametro, 4-lobato, lobis triangulari-ovatis, 2 mm. longis apice obtusis intus barbatis. Stamina 4, infra sinus inter lobos inserta, filamentis brevissimis triangularibus basi dilatatis $\frac{1}{2}$ mm. longis, antheris atro-fuscentibus, oblongis $1\frac{1}{3}$ mm. longis, apice apiculatis, basi sagittatis. Ovarium ovatum $1\frac{1}{3}$ mm. longum, glabrum albo-rubescens, stylo incrassato-filiformi, 8 mm. longo, recurvato, atro-fuscente, lepidibus albicantibus parce obtecto.

Hab. in monte Morrison, leg. T. Kawakami et U. Mori, 1908, (Nos. 1891 et 1952).

The present plant was referred to *E. umbellata* Thunb. by myself in the paper above cited. Studying more carefully, I have found that there exists some difference between my plant and Thunberg's species, especially in the structure of flowers, though they are very near. It is also near *E. Thunbergi*, but differs from it in having narrower leaves, and in the corolla-lobes.

Loranthaceæ.

Loranthus Linn.

Loranthus Owatarii Hayata in Matsum. et Hayata Enum. Pl. Formos. p. 357.

This is near *L. nodiflorus* Thw., but differs from it in having spicate and much smaller flowers, which are not clustered as is the case with *L. nodiflorus*. It comes also very near *L. odoratus*; but differs in having broader leaves, and in the fruit. In my species, fruits are rounded at the apex, but, in the other, they are more or less rostrate.

Santalaceæ.

Thesium Linn.

Thesium chinense Turcz.

Hab. Liukiu, leg. G. Nakahara.

Not yet known from Formosa.

Euphorbiaceæ.

Euphorbia Linn.

Euphorbia Atoto Forst.; Boiss. in DC. Prodr. XV.-2, p. 12; Hance in Journ. Bot. (1878), p. 232; Maxim. in Mél. Biol. XI. p. 831; Hook. f. Fl. Brit. Ind. V. p. 248; Forbes et Hemsl. Ind. Fl. Sin. II. p. 411.

Hab. Garanbi, leg. S. Nagasawa, 1908.

DISTRIB. China : Pratas island, Hongkong, Hainan ; Ceylon, Malaya, Polynesia, Australia.

Euphorbia formosana HAYATA sp. nov.

Euphorbia dendroides HAYATA Rev. Euphorb. et Bux. Jap. p. 65, (non LINN.).

Herba suffrutescens, cinerascens, glabra, cicatricibus foliorum transversis notata. Folia ad summum caulium approximata, alterna, subsessilia, linearia, 6 cm. longa, 6 mm. lata, apice acuta, aristato-apiculata, basi obtusa, integra horizontaliter recurvata, uni-nervia. Umbella 6-radiata, foliis caulinis conformibus involucrata, radiis 1-2 cm. longis, umbellulis 5-6-radiatis, radiis 3 mm. longis, basi umbellularum foliis 3 obovatis 7 mm. longis involucratis. Involucrum basi 2-bracteatum, (bracteis obovatis apiculatis 5 mm. longis), urceolatum $2\frac{1}{2}$ mm. longum, totiusque latum, 4-glanduliferum, glandulis late rotundatis peltatis, exappendiculatis, 4-lobatum, lobis inflexis ciliolatis, intus bracteolatum, bracteolis obovatis truncatis $2\frac{1}{2}$ mm. longis, longe barbatis. Fl. ♀ : pedicellis apice leviter dilatatis ; ovarium ovoideum, $1\frac{1}{4}$ mm. longum, 3-sulcatum secus sulcum costatum, verrucis conicis dense obtectum, stylis 3, basi coalitis, apice bifidis subincrassatis. Fl. ♂ : stamen 1, pedicellatum pedicello $2\frac{1}{2}$ mm. longo, filamento $1\frac{1}{4}$ mm. longo incrassato, anthera incrassata, rimis transversis.

HAB. Tōseikaku, leg. K. MIYAKE, 1898.

Euphorbia Makinoi HAYATA sp. nov.

Euphorbia microphylla HAYATA Rev. Euphorb. Bux. Jap. p. 79. t. V., H, (non HEYNE).

Caulis filiformis tenuissimus, prostratus, dichotome ramosus, subglaber, foliatus, foliis a se 5 mm. remotis, exsiccato fuscentibus. Folia oblonga 2-3 mm. longa, $1\frac{1}{2}$-2 mm. lata, valde inæqualia, sub-

cordato-ovata v. ovato-elliptica apice obtusa basi rotundata vel cordata, margine integra, plus minus albo-marginata, venulis reticulatis inconspicuis, brevissime petiolata, stipulis interpetiolaribus late triangularibus apice denticulatis, denticulis acutis. Involucra axillaria solitaria, vel ad apicem ramulorum simplicium brevissimorum axillarium solitaria, sessilia, turbinato-campanulata, utrinque subglabra, lobis 1-3-fidis, glandulis inter lobos transversis, oblongis, appendiculatis, appendicibus 2-3-lobatis, brevibus. Styli breviores bifidi apice subincrassati. Capsulæ depresso-ovoideæ, trigonæ, 3-lobatæ, 1½ mm. in diametro, coccis acute carinatis, facie lævibus. Semina ovato-tetragona (angulis obtusis) 1 mm. longa, tenuiter rugulosa.

Hab. Tamsui, leg. T. Makino, 1896.

The present plant was identified with *E. micophylla* Heyne by myself, only by the description given in Hook. f. Fl. Brit. Ind. V. p. 252, without seeing any specimen of it. Since coming to Kew, I have compared my plant with Heyne's type and found that they are not exactly identical. The present plant differs from any species of the genus in having very much smaller leaves.

Bridelia Willd.

Bridelia ovata Decne.

Bridelia pachinensis Hayata in Matsum. et Hayata Enum. Pl. Formos. p. 362.

Bridelia Kawakamii Hayata l. c. p. 362.

Hab. Chōsōkei, leg. G. Nakahara, Juli. 1905, (No. 156); Shintiku, leg. T. Kawakami et U. Mori, Juni. 1906, (No. 1425); Maruyama, leg. U. Faurie, Mai. 1903, (No. 18).

Distrib. Australia, Birma, Malaya, Ins. Timor.

Compared with specimens of the species at Kew.

Phyllanthus Linn.

Phyllanthus Emblica Linn. Muell. Arg. in DC. Prodr. XV.-2, p. 352 ; Benth. Fl. Hongk. p. 312 ; Hook. f. Fl. Brit. Ind. V. p. 289 ; Forbes et Hemsl. Ind. Fl. Sin. II. p. 421.

Phyllanthus Niinamii Hayata in Matsum. et Hayata Enum. Pl. Formos. p. 360.

Distrib. China : Hongkong, Hainan. Throughout tropical India and Malaya.

Glochidion Forst.

Glochidion album Muell. Arg.

Glochidion formosanum Hayata Rev. Euphorb. Bux. Jap. p. 20, t. II., G.

Compared with a specimen so labelled at Kew.

Glochidion Fortunei Hance. ; Forbes et Hemsl. Ind. Fl. Sin. II. p. 424.

Glochidion obovatum Hayata (pro parte) in Rev. Euphorb. Bux. Jap. p. 19, (non Sieb. et Zucc.).

Hab. Uraisha, Dec. 1907, (No. 80).

Distrib. China ; Fokien.

Observ. Folia oblonga 8 cm. longa, 3 cm. lata, apice acuminata basi attenuata, petiolis 4 mm. longis.

Differs from *G. obovatum* by the acuminate leaves.

Glochidion hongkongense Muell. Arg. in Linnæa XXXII. p. 60 ; Forbes et Hemsl. Ind. Fl. Sin. II. p. 424.

Glochidion zeylanicum Hayata (pro parte) in Matsum. et Hayata Enum. Pl. Formos. p. 360.

Hab. Kelung, leg. T. Kawakami et S. Sasaki, Mai. 1908; Hōranzan, leg. T. Kawakami et Y. Shimada, (No. 5206).

Distrib. Hongkong.

Glochidion liukiuense Hayata sp. nov. Ramuli graciles striati, fuscentes glabrati. Folia alterna, petiolata, oblongo-lanceolata, 11 cm. longa, 33 mm. lata, apice longe acuminata, (acuminibus 1½ cm. longis), basi acuta valde obliqua, costis et venis utraque pagine elevatis, venis primariis utraque latere 6, a costa angulo 40° egressis, venis secundariis transversis, coriacea. Flores fasciculati, supra-axillares, fasciculis pedunculatis, pedunculis 7 mm. longis ad apicem 30-40-floriferis, floribus pedicellatis, pedicellis 7 mm. longis gracillimis. Fl. ♂: sepala 6, valde imbricata, ovata obtusa. Stamina 6 sessilia, connectivis productis; rudimentum ovarii minutum. Fl. ♀: sepala 6, valde imbricata, ovata acuta. Ovarium globosum, stylo brevissimo, 5-loculare. Capsula depresso-globosa 5-lobata.

Hab. Liukiu.

Breynia Forst.

Breynia officinalis Hemsl. in Forbes et Hemsl. Ind Fl. Sin. II. p. 427.

Hab. Taihoku, leg. T. Kawakami, 1909, Mai. (No. 5853).

Distrib. An endemic plant.

Daphniphyllum Blume.

Daphniphyllum pentandrum Hayata sp. nov.

Daphniphyllum himalayense Hayata Rev. Euphorb. Bux. Jap. p. 34, t. II., L, (non Muell. Arg.).

Folia lanceolata, 8-11 cm. longa, 2½-3 cm. lata, acuminata,

basi acuta, integra, subtus fusco-glaucescentia, supra minute impresso-reticulato-venosa, exsiccato-fuscentia, petiolis 2½-3 cm. longis, stipulis crassiusculis elongato-triangularibus. Flores ♂ : calyx 5-lobatus, lobis triangularibus acutis, crassiusculis. Stamina 5, rarius 6-7, glandulis simplicibus cylindraceis cum stamina alternis, antheris late globosis apice apiculatis, loculis distinctis, facie minute glanduloso-punctatis, filamentis antheras in longitudine æquantibus.

Hab. Shifun, leg. K. Miyake, 1898.

Near *D. himalayense* Muell. Arg., but differs from it in the leaves and flowers. The lateral primary veins of the new species are not prominent and very obscure, while those of the other species are very prominently elevated. Male flowers of the Himalayan plant are very much larger than those of the Formosan.

Claoxylon A. Juss.

Claoxylon rubescens Miq. ?

Hab. Kōtōshō, leg. G. Nakahara, Mart. 1906, (No. 1054).

In the imperfectness of the specimen, the determination is rather conjectural.

Acalypha Linn.

Acalypha akœnsis Hayata sp. nov. Suffrutescens, ramis rubescentibus, teretibus, sublævibus, subglabris, parcissime pilosis. Folia membranacea, acuto-ovata, 13 cm. longa, 8 cm. lata, apice cuspidato-acuta, sursum obtusa, basi cuneato-cordata, vel rotundato-cordata, margine serrulata, (serrulis acutis), sursum ad cuspides et prope basin subintegra, utrinque ad paginam parce pilosa, ad venas brevissime pubescentia, 5-nervia, costis venis venulisque

distincte elevatis, tenuissimis, petiolis 6-7 cm. longis, brevissime denseque pubescentibus etiamque pilosis, stipulis lanceolatis, 12 mm. longis acuminatis, extus dense intus parce brevissime pubescentibus. Flores monœcii, spicati. Spicæ ♂ : amentiformes, gracillimæ, filiformes, recurvatæ, 18 cm. longæ, villoso-pubescentes, pedunculis 1 cm. longis, bracteis ovatis $\frac{2}{3}$ mm. longis, extus dense pilosis, intus glabris, margine ciliatis, floribus secus rhachin hac atque illac remote glomeratis, bracteis inter flores lanceolatis, 1 mm. longis, ciliatis. Alabastrum floris ♂ : minutum tetragono-turbinatum, $\frac{1}{2}$ mm. in diametro basi articulatum. Spicæ floris ♀ : graciles 9 cm. longæ, pubescentes, pedunculis 1 cm. longis, bracteis ovatis $\frac{2}{3}$ mm. longis, extus dense pilosis, intus glabris, remote floratis, bracteis latissimis $3\frac{1}{2}$ mm. longis, 5 mm. latis, 10-nerviis, extus pubescentibus, intus glabris, 10-dentatis, ciliolatis, generaliter 2-florem amplectantibus, floribus altero fertilibus, altero sterilibus, bracteolis minutis ciliolatis. Perianthium 3-fidum, laciniis ovatis acutis $\frac{2}{3}$ mm. longis ciliolatis. Ovarium depresso-globosum, 3-lobatum, hirsutum, stylis distinctis, $2\frac{1}{2}$ mm. longis, prope basin laciniatis, laciniis filiformibus.

Hab. Akō : Kotanshō : leg. G. Nakahara, Sept. 1905, (No. 537).

Near *A. grandis* Benth. and *A. stipulacea* Klotzs., but differs from the former in having leaves which are cuneately cordate at the base, and from the latter in the bracts of female flowers. The leaves of *A. grandis* are rounded or obtuse, but never cordate, at the base.

Acalypha formosana Hayata sp. nov. Suffrutescens. Rami hirsuti, teretes, multi-sulcati, læves, patento-hirsuti, pilis transversim patentibus. Folia magna membranacea, longe petiolata, globoso-ovata, 23 cm. longa, 15 cm. lata, apice cuspidato-acuta, (cuspidibus 2 cm. longis, 3 mm. latis, subintegris), basi late rotundata,

ima cordata, (sinibus acutis), margine brevissime serrulata, (serrulis obtusis), sursum in cuspidem et prope basin subintegra, utraque ad nervas et venas dense, ad paginam, pauce hirsuta margine ciliolata, nervis venis venulisque utrinque tenuissime elevatis, tenuissimis, basi 5-nervia, petiolis 8-10 cm. longis, gracilibus, apice dense, cæterum parce pilosis, pilis patentibus, etiamque brevissime pubescentibus, stipulis acuminato-ovatis, 8 mm. longis, extus densissime, intus parce, brevissime pubescentibus. Spicæ ♀ axillares, solitariæ, graciles, 7 cm. longæ, remote floratæ, pedunculis 1 cm. longis, bracteis conspicuis, semiorbicularibus plicatis, flores amplectantibus, 5 mm. longis, 7 mm. latis, extus dense pubescentibus, intus glabris, margine ciliatis 10-nerviis, palmatim 10-dentatis, (dente centrali majore, $2\frac{1}{2}$ mm. longo, $1\frac{1}{2}$ mm. lato, acuto), bracteolis intra bracteam minutissimis ovatis, $\frac{1}{2}$ mm. longis, pubescentibus. Perianthium 3-fidum, segmentis ovatis, $\frac{2}{3}$ mm. longis, ciliolatis. Ovarium globosum 3-lobatum, hirsutum, $\frac{2}{3}$ mm. longum, stylo 3-partito, 4 mm. longo, ramis apice laciniatis, laciniis filiformibus.

Hab. Randaisan, leg. B. Hayata et U. Mori, 1908, Aug. (No. 7085).

Near *A. grandis* Benth., but differs from it in having very obscurely serrulate leaves and very much smaller bracts of female flowers.

Alchornea Sw.

Alchornea liukiuensis Hayata sp. nov.

Alchornea trewioides Hayata Rev. Euphorb. Bux. Jap. p. 47, t. IV. A. (non. Muell. Arg.)

Suffrutex? Folia longe petiolata, cordata, ovata, cuspidato-

acuminata, 7-15 cm. longa, 6-14 cm. lata, margine serrulata, 3-nervia, basi supra 2-glandulosa, stipulis lanceolatis linearibus. Flores monœcii subsessiles. Spicæ terminales simplices, floribus ♂ et ♀ parvis secus rhachin glomeratis, bracteis minutis. Alabastrum floris ♂ depresso-globosum tetragonum, segmentis valvatis. Flores ♂ apertientes 5 mm. in diametro, sepalis 4 triangularibus acutis 1½ mm. longis, intus glabris, extus sursum glanduloso-punctatis. Stamina 8, biseriatim disposita, filamentis crassis, basi in annulum connatis, antheris globosis introrsis, utrinque emarginatis dorsifixis, connectivis antice inter loculos, loculis distinctis apice connatis. Ovarii rudimentum 0. Fl. ♀ : sepala 5, imbricata, lanceolata, acuminata, 2½ cm. longa, ovarium superantia, extus pubescentia intus glabra, inæqualia, intimo minuto. Ovarium globosum 3-loculare, (ovulis in loculis solitariis), pubescens, stylis distinctis, linearibus, indivisis, basi connatis, angulo 180° divaricatis intus papillosis, 5 mm. longis apice acuminatis descedento-recurvatis, utrinque pubescentibus.

Hab. Liukiu, leg. J. Matsumura, 1897 ; Kumeshima, leg. H. Kuruiwa, 1898.

Near *A. trewioides* Muell. Arg., but differs from it in having conspicuously serrated leaves. The leaves of the other species are mostly obscurely serrated.

Mallotus Lour.

Mallotus formosanus Hayata sp. nov. Rami fusco-purpurascentes, leviter longitudinaliter rugulosi, lenticellis minutis notati, ramulis gracilibus indumentis mollissimis rubro-albicantibus obtectis. Folia longe petiolata, late quinquangularia, divaricate tricuspidata, 7 cm. longa, 8 cm. lata, apice cuspidata, basi truncato-

acuta, marginibus utraque latere ad basin angulo 150 se divaricatis, interdum circ. angulo 180°, vel interdum angulo plus acuto divaricatis, vel basi cuneato-acuta, (folia novella rarius rhomboidea 1-cuspidata), cuspidibus centralibus longioribus 2½ cm. longis, 2 cm. latis apice obtusis, cuspidibus lateralibus æquilongis, valde divaricatis, margine repandato-den'ata, prope basin subintegra, distincte 3-nervia, nervis ad apicem cuspidum attingentibus angulo 40° a se divaricatis, venulis transversis reticulatis ad basin foliorum semicirculos concentricos ducentibus, supra fusco-purpurascentia, nervis venisque impressis, primum indumentis rubescentibus obtecta, demum subglabrata, ad insertionem petiolorum brevissime minute cordata 2-glandulosa, glandulis lentiformibus 1½ mm. longis, subtus indumentis mollissimis densissimis fulvo-albicantibus densissime obtecta, indumentis pilis stellatis, nervis venisque elevatis, petiolis 4-5 cm. longis indumentis densissime obtectis. Flores paniculato-spicati, paniculis terminalibus vel rarius axillaribus, gracillimis recurvatis, crassiuscule filiformibus, 14 cm.–15 cm. longis, pauci- vel multi-ramosis, ramis divaricatis, densissime stellato-tomentosis. Fl. ♂ : ad nodos plus minus tumidos spicarum glomerati, bracteis minutis cuspidatis rotundatis ⅔ mm. longis, pedicellis 2 mm. longis supra basin articulatis. Perianthium 3-partitum, segmentis ovatis, 2¼ mm. longis, 1¾ mm. latis, obtusis extus stellato-tomentosis intus glabris. Stamina ∞, circ. 2 mm. longa, antheris latissimis locellis divaricatis distinctis ascendentibus connectivis latissimis, filamentis distinctis vel basi plus minus connatis. Rudimentum ovarii 0. Fl. ♀ ignoti. Fructus ad paniculam spicatum profuse dispositi, depresso-globosi, 5½ mm. in diametro, leviter 3-lobati, (apice plani, inermis), (latere rotundati echinati, echinis reflexis 1 mm. longis), mollissime tomentosi, trivalvatim dehiscentes, (valvis intus glabris), 3-spermi. Semina globosa

plus minus obliqua, nigricantia, nitida, 2½ mm. in diametro.

Hab. in monte Kohoshō; Fukō, 1898, Mart.

Near *M. cochinchinensis*, but differs from it in having less echinate capsules, and much broader, tricuspidate, irregularly dentate leaves.

Mallotus paniculatus Muell. Arg. in Linnæa XXXIV. p. 189, et in DC. Prodr. XV.-2, p. 965.

Hab. Tappansha, leg. S. Nagasawa, Oct. 1905, (No. 713).

Distrib.

Observ. I think this is quite distinct from *M. cochinchinensis* Lour. to which it is reduced by W. B. Hemsley in Ind. Fl. Sin. II. p. 439.

Excœcaria Linn.

Excœcaria crenulata Wight var. **formosana** Hayata n. v.

Excœcaria crenulata Hayata Rev. Euphorb. Bux. Jap. p. 60, (non Wight).

Rami validiusculi, rugosi, fusco-rubescentes, ramulis subgracilibus. Folia opposita, petiolata, oblongo-lanceolata, 10 cm. longa, 3 cm. lata, apice acuminata, (acuminibus 15 mm. longis), basi rotundato-acuta, remote et obscure crenulato-serrulata, crenis obtusis, venis primariis utrinque latere 12, a costa angulo 70° egressis, arcuatis, utraque pagine concoloria, membranaceo-coriacea. Flores minores spicati, spicis axillaribus, vel ad apicem ramulorum terminalibus, cylindraceis dense floriferis, circ. 1 cm. longis, pedunculis 5 mm. longis. Fl. ♂: ad partes superiores spicarum dense spiraliter dispositi, sessiles basi 1-bracteati et 2-bracteolati, bracteis crassiusculis latissimis 1½ mm. latis, ½ mm. longis, breve cuspidatis utraque latere auriculato-glandulosis, bracteolis ad basin bractearum

et intra bracteam sitis, minutis, ovatis 1 mm. longis laciniatis. Calyx profunde 3-lobatus, lobis ½ mm. longis laciniatis. Stamina 3, subsessilia ; rudimentum ovarii O. Fl. ♀ : ad basin spicarum 1-2, sessiles basi 1-bracteati et 2-bracteati, bracteis et bracteolis ut fl. ♂. Calyx 3-partitus, segmentis cuspidatis laceratis 1 mm. longis. Rudimentum staminum O. Ovarium ovoideum 1½ mm. longum, stylo 3-partito, ramis supra sulcatis, 2½ mm. longis recurvatis. Capsula depresso-globosa 5 mm. longa, 8 mm. lata. Semina subglobosa, 4 mm. lata, 5 mm. longa, lævia, eleganter reticulata.

Urticaceæ

Celtis Linn.

Celtis formosana Hayata sp. nov.

Celtis philippinensis Hayata in Matsum. et Hayata Enum. Pl. Formos. p. 369, (non Blanco).

Rami fusco-rubescentes lenticellis minutis dispersi, ramulis gracillimis. Folia alterna, petiolata, oblique ovata, 7 cm. longa, 33 mm. lata, apice cuspidata vel acuta, (cuspidibus obliquis), basi oblique rotundata, trinervia, venis supra leviter, subtus prominente, elevatis, venis primariis lateralibus utrinque 1-2, venis secundariis et venulis inconspicuis reticulatis, utrinque glabra, subtus subglauca, exsiccato utrinque pallidiora, margine sursum obscure serrata, deorsum integra, vel integerrima, coriacea, petiolis 8 mm. longis. Flores ignoti. Fructus axillares solitarii, pedicellati, pedicellis gracilibus 1 cm. longis. Drupa succulenta ovoidea, 7 mm. longa.

Hab. Kōshūn : Naibun, leg. G. Nakahara, Feb. 1907 ; Shizangan, Kelung, et Pikaku, leg. T. Makino, 1896.

The present plant greatly differs from *C. philippinensis.*

In *C. philippinensis*, the leaves are quite entire, more coriaceous, less reticulate and much larger, while in the present plant they are thinly coriaceous, serrate towards the apex, and acuminate or almost caudate. Besides, the two are easily distinguishable by the general appearance. Our plant is near *C. australis* Linn. and *C. tetrandra*, Roxb., but differs from the former by the quite glabrous fruit and from the latter by the leaves, which are serrate only towards the apex.

Broussonetia Vent.

Broussonetia Kæmpferi Sieb.; Bureau in DC. Prodr. XVII. p. 226; Kurz in Journ. Bot. (1873), p. 193 ; Franch. et Savat. Enum. Pl. Jap. I. p. 433 ; Forbes et Hemsl. Ind. Fl. Sin. II. p. 455.

Hab. Randaizan, leg. T. Kawakami et U. Mori, 1909, Mart. (No. 3716); Shinkō : Gatton, 1907, Mai. (No. 2824) ; Shintiku : Goshizan, leg. T. Kawakami, 1906, Juni. (No. 5971).

Distrib. Japan.

Ficus Linn.

Ficus Konishii Hayata sp. nov. Arbor, truncis 12 m. altis, $\frac{2}{3}$ m. in diametro, ramulis fusco-cenirascentibus longitudinaliter rugosis cicatricibus oblongis foliorum notatis. Folia alterna, petiolata, ovata, 15 cm. longa, $7\frac{1}{2}$ cm. lata, apice subito acuminata, (acuminibus linearibus vel angustis 15 mm. longis 4 mm. latis apice acutis), basi æqualia vel inæqualia rotundata, vel acuta, trinervia, additis 2-nervis basilaribus minoribus, nervis lateralibus a

nervo centrali angulo 40° egressis, (venis secundariis utraque latere 4-5, a costa angulo 60° egressis, arcuatis prope marginem anastomosantibus), utrinque glabrata vel subtus pubescentia, pallidiora margine subintegra vel remote repandata, petiolis longioribus 4 cm. longis, stipulis angustatis acutis 12 mm. longis 3 mm. latis caducissimis. Receptaculum ad truncos vel ramos aphyllos remote fasciculatim situm, pedunculatum, (pedunculis 4 cm. longis gracilibus vix hirsutis), depresso-pyriforme, ∞-costatum, costis obscuris, extus papilloso-punctatum 12 mm. longum, 16 mm. latum, ore depresso-elevato circa orem bracteatum, (bracteis extus erectis vel clausis latissimis crassiusculis, intus ∞-seriatis erectis vel ascendentibus, interiore gradatim pendulis angustioribus 2 mm. longis ¾ mm. latis apice truncatis), basi receptaculi 3-bracteatum, bracteis triangularibus 2 mm. longis 2 mm. latis obtusis. Fl. ♀ : breve pedicellati vel sessiles. Perianthia 3-6-partita, segmentis linearibus vel spathulatis 1-1½ mm. longis rubescentibus. Ovarium obovatum 1 mm. longum, obliquum, stipitatum, (stipitibus ½-1 mm. longis), vel subsessile, stylo laterali ascendento-erecto 1 mm. longo, stigmate cylindrico ; bracteis inter flores linearibus 1½ mm. longis.

HAB. Giranchō : Banseakō, leg. N. KONISHI, Aug. 1907, (No. 28).

Near *F. Harlandi* BENTH., but distinguishable from it by the ovate trinerved leaves ; also near *F. lævis* BL. and *F. pomifera* WALL., but differs from both in the shape of the receptacles

Ficus koshunensis HAYATA sp. nov. Ramuli validiusculi fuscentes hispido-tomentosi ad nodos lenticellati. Folia subopposita, vel alterna, petiolata, stipulata, lineari-lanceolata, vel lanceolata, 14 cm. longa, 3 cm. lata, apice acuta basi truncata, supra hispi-

dula, scaberrima, subtus hispido-tomentosa, pallidiora, trinervia, nervis basilaribus minoribus, vel pinninervia, venis primariis utrinque latere 7, a costa angulo 60° egressis, arcuatis prope marginem anastomosantibus, margine remote obscureque repandata, petiolis 1 cm. longis, stipulis longe triangularibus 12 mm. longis, basi 5 mm. latis, acuminatis, caducissimis extus pubescentibus. Receptaculum axillare solitarium pedunculatum, (pedunculis 1 cm. longis, pubescentibus), late pyriformi-globosum, 1½ cm. longum, totiusque latum basi 1-seriatim bracteatum, (bracteis 3 rotundato-triangularibus, obtusis 3 mm. longis 3½ mm. latis), apice rotundatum, ore ∞-seriatim bracteatum, bracteis extus erectis vel clausis latissime triangularibus. Fl. ♀: pedicellati, vel sessiles, perianthia 4-6-partita, segmentis lanceolatis erectis ovarium includentibus 1½ mm. longis rubro-nigricantibus. Ovarium semiorbiculare, stylo obliquo, stigmate truncato.

Hab. Kōshūn, leg. N. Konishi, (No. 27).

Near *F. erecta* Thunb., but differs from it in having hairy leaves and not stipitate receptacles. Those of *F. erecta* are attenuate to the stalk at the base.

Ficus Kusanoi Hayata sp. nov. Ramuli validiusculi rubro-cinerascentes longitudinaliter rugosi, cicatricibus oblongis remote notati. Folia alterna petiolata, oblongo-ovata, 12 cm. longa, 5½ cm. lata, apice acuminata, basi rotundata vel truncata, utrinque viridia, scaberula, margine repandata, tri-nervia, venis primariis lateralibus utrinque 3-4, a costa angulo 40° egressis, petiolis 12 mm. longis, stipulis lanceolatis caducissimis. Receptacula 2-3 aggregata axillaria, breve pedicellata, (pedicellis 2-3 mm. longis), late globosa, 8 mm. longa, totiusque lata, facie papilloso-globoso-punctata, (oribus margine elevato-annularibus, extus bracteis brevibus latissimis

∞-seriatis multo-annulatis), basi 3-bracteata, bracteis late triangularibus, ½ mm. longis 1 mm. latis, caducissimis. Fl. ♀; pedicellati vel sessiles, perianthia hyalina 5-6 partita, segmentis lineari-spathulatis, tenuissimis, apice ciliatis, 1½ mm. longis. Achænia ellipsoidea 1½ mm. longa, pericarpiis crustaceis flavescentibus, stylis persistentibus lateralibus, stigmatibus cylindricis coccineis, bracteis inter flores paucis.

Hab. Kōtōshō, leg. S. Kusano, 1909.

Ficus maruyamensis Hayata sp. nov. Frutex 2 m. altus, ramis subglabris rubescentibus cicatricibus semiorbicularibus notatis, ramulis nigro-tomentosis, pilis patentibus. Folia alterna petiolata, stipulata, oblonga, 9 cm. longa, 4½ cm. lata, apice oblique acuta, basi rotundato-cordata, vel rotundata, supra scaberula vel scaberrima pilis brevibus parce obtecta, ad costas dense pubescentia, subtus villosa vel breve tomentosa, venis subtus prominentibus, 3-nervia, nervis basilaribus et venis primariis lateralibus prope marginem ascendentibus anastomosantibus, venulis paullo vel valde prominentibus, petiolis 1½ cm. longis, supra tomentoso-sulcatis, stipulis longe triangularibus 12 mm. longis basi 5 mm. latis acutis caducissimis extus pubescentibus. Receptaculum fl. ♀ ad axillas foliorum annotinorum solitarium, vel geminatum, pedunculatum, (pedunculis 1 cm. longis pubescentibus), pyriformi-globosum 1 cm. longum, extus hirsutum, (ore extus bracteis erectis vel clausis latissime ovatis 2½ mm. latis 1½ mm. longis, intus bracteis minoribus ∞-seriatis angustioribus instructo), basi 3-bracteatum, bracteis late ovatis, 2½ mm. longis 3½ mm. latis, apice rotundatis. Fl. ♀ breve stipitati, perianthia 3-4-5-partita, segmentis lanceolatis incurvis concavis, 1 mm. longis, ½ mm. latis, rubescentibus, margine hyalinis. Ovarium orbiculare, complanatum, stylo oblique apice

recurvo Achænia semilunaria, $1\frac{3}{4}$ mm. longa, $1\frac{1}{2}$ mm. lata, pericarpiis crustaceis flavescentibus glabris, stylis obliquis persistentibus. Semina achænio conformia, testa membranacea.

Hab. Maruyama, leg. T. Kawakami et B. Hayata, Juli. 1908.

Near *Ficus glandulifera* Wall., but quite distinguishable by the cordate base of of the leaves.

Ficus obscura Blume.; Forbes et Hemsl. Ind. Fl. Sin. II. p. 464; Matsum. et Hayata Enum. Pl. Formos. p. 379.

Hab. Uraisha, leg. N. Konishi, Sept. 1907, (No. 64).

Ficus rapiformis Roxb. "Fl. Ind. III. p. 551"; Wight Ic. Pl. Ind. Or. t. 637.

Hab. Kōtōshō, leg. T. Kawakami et U. Mori, 1907, Aprili. (No. 2470).

Distrib.

Compared with a specimen so labelled at Kew. The species is reduced to *F. leucantatoma* Poir. by some authors.

Ficus taiwaniana Hayata sp. nov. Ramuli glabri, graciles, fusco-cinerascentes, cortice nudo demum soluto. Folia alterna, petiolata, stipulata, obovato-rhomboidea, 8 cm. longa, $3\frac{1}{2}$ cm. lata, apice cuspidato-acuminata, basi cuneato-acuta, leviter obliqua, utrinque glabra, subtus pallidissima, venis primariis utrinque latere 5-6, a costa angulo 40° egressis, prope marginem arcuatis anastomosantibus, margine sursum grosse 2-3-dentata, dentibus obtusis, deorsum integra, vel omnia integra, petiolis 8 mm. longis, stipulis lanceolatis 3 mm. longis. Receptaculum ad axillas foliorum superiorum solitarium, pedunculatum, (pedunculis $\frac{1}{2}$-1 cm. longis, pyriformi-ovoideum 12 mm. longum 8 mm. latum, apice acutum

infra apicem contractum, basi abrupte angustatum ad stipitem 2 mm. longum attenuatum, basi 3-bracteatum, (bracteis triangularibus 1½ mm. longis, margine ciliolatis), ore ∝-seriatim bracteatum, bracteis 3-meris, triangularibus extus erectis vel clausis intus horizontaliter patentibus vel pendulis, triangularibus, margine ciliolatis. Fl. ♀: longe pedicellati, pedicellis 1½ mm. longis, perianthia 4-6-partita, segmentis ovatis ⅓ mm. longis rubro-punctatis. Fl. ♂: stamina 2 segmento æquilonga vel longiora, antheris parallelis distinctis, connectivis apiculatis. Flores (gall.) maturi sessiles, segmenta 4-6 patentia. Ovarium longe stipitatum, stipite 1½ mm. longo, stylo laterali; bracteis inter flores paucis vel 0.

Hab. Taikō, leg. T. Kawakami et U. Mori, Aug. 1908, (No. 12).

Near *F. formosana* Maxim., from which the present plant differs in having pyriformed smaller fruit, and leaves with large teeth towards the apex; also near *F. clavata* Wall. (King, t. 111) from which this differs in having glabrous receptacle. It bears also some resemblance to *F. pyriformis* H. et A. There are very many different forms of the same fig from China and India at Kew; but none is the same as the Formosan plant.

Artocarpus Forst.

Artocarpus incisa Linn. f.

Hab. Kihōsha et Kwarenkō, leg. K. Miyake, 1899. Found in cultivation.

Laportea Gaudich.

Laportea subglabra Hayata sp. nov. Frutex. Rami validiusculi, albo-cinerascentes, subglabri, cicatricibus semilunaribus

remote notati. Folia decidua, alterna, petiolata, stipulata, oblonga vel obovata, 15 cm. longa, 9 cm. lata, apice breve abrupteque acuta, basi rotundata, ima basi pauce cordata, supra scabriuscula, ad venas pubescentia, subtus pubescentia vel subglabra, venis primariis utrinque 10 a costa angulo 50° egressis, membranaceo-crassiuscula, petiolis 6 cm. longis dense pubescentibus, stipulis caducissimis late triangularibus 1 cm. longis, basi 12 mm. latis, apice 2-dentatis, dorso 2-alato-costatis, extus pubescentibus. Flores paniculati, paniculis ad axillas foliorum superiorum ramulorum dispositis patentibus. Paniculæ solitariæ ad axillas cernuæ, 5 cm. longæ, romosæ, ramis et ramulis rectangulariter divaricatis, ad ramificationem bracteatis, bracteis triangularibus. Fl. ♀ ad apicem dilatatum complanatum ramulorum panicularum 4-5-congesti sessiles, sub singulo flore 2-bracteolati, bracteolis minutis subulatis. Perianthii segmenta 4 strigosa, valde inæqualia, exterioribus minoribus, interioribus majoribus ovatis ½ mm. longis. Ovarium obliquum, stigmate lineari, elongato, uno latere hirtello, reflexo. Achænia obliqua plano-compressa, orbicularia 2 mm. in diametro, breve stipitata vel subsessilia, perianthio membranaceo immutato; pericarpium carnosulum subglabrum; semina conformia, testa membranacea.

Hab. Hokkōkei, leg. C. Owatari, Jan. 1898.

Near *L. pterostigma* Hance, from which the present plant differs in having oblong or obovate leaves which are much smaller and nearly glabrous. In *L. pterostigma*, the leaves are much longer, shortly villose beneath, ovate, (broadest at the basal portion), and obscurely toothed. Also near *L. crenulata* Gaud., but differs from it by the leaves with primary lateral veins which spread out in an acuter angle.

Pilea LINDL.

Pilea anisophylla WEDD.; FORBES et HEMSL. Ind. Fl. Sin. II. p. 475.

HAB. Bankingsing, (A. HENRY.)

Pilea petiolaris BLUME.

HAB. Shintiku, Goshizan, leg. T. KAWAKAMI, 1905, Dec. (No. 1298).

Compared with a specimen so labelled at Kew.

Pellionia GAUDICH.

Pellionia radicans WEDD. in DC. Prodr. XVI.-1, p. 167 ; ? FORBES et HEMSL. Ind. Fl. Sin. II. p. 481; MATSUM. et HAYATA Enum. Pl. Formos. p. 384.

HAB. Nantō, Suisha, leg. T. KAWAKAMI et U. MORI, 1908, Mart. (No. 3538) ; Shintiku : Goshizan, leg. T. KAWAKAMI et U. MORI, 1908, Jan. (No. 5112).

Pellionia trilobulata HAYATA sp. nov. Herba, gracilis, tenuis, procumbens, ad nodos radicans, glabra. Folia alterna, petiolata, oblique rectangulo-obovata, 9 mm. longa, 5 mm. lata, apice rotundata, 3-lobulata, basi valde obliqua, latere inferiore latiore truncata, latere superiore angustato-acuta, venis primariis lateralibus utrinque 2-3, margine præter apicem integra, supra pilis brevibus adpresse obtecta, subtus pallidissima glabra, petiolis 1 mm. longis, basi 1-squamatis, squamis oppositifoliis lanceolatis 1½ mm. longis. Fl. ♀ capitati, capitulis ad axillas foliorum solitariis, pedunculatis, pedunculis folio æquilongis. Capitula 5-6 florata, ∞ - bracteata, bracteis ovatis

2½ mm. longis 1½ mm. latis apice ciliatis. Flores ad receptaculum sessiles vel brevissime pedicellati, infra perianthium articulati. Perianthium 4-partitum, segmentis obovatis, hyalinis apice viride coloratis infra apicem calloso-apiculatis, 2 mm. longis, 1 mm. latis. Stamina 4, segmentis perianthii opposita, filamentis expansis, (in alabastro inflexis), antheris albis oblongis 1 mm. longis. Rudimentum ovarii 0.

Hab. Randaizan, leg. B. Hayata et U. Mori, Aug. 1908.

Very near *Pellionia radicans*, from which the present plant is distinguishable by obovate leaves with a nearly truncate and 3-lobulate apex.

Bœhmeria Jacq.

Bœhmeria spicata Thunb. var. **duploserrata** C. H. Wright in Forbes et Hemsl. Ind. Fl. Sin. II. p. 488.

Hab. Nantō: Nankōkei, leg. T. Kawakami et U. Mori, (No. 3389), 1908, Juli.

Distrib. Chekiang.

Bœhmeria formosana Hayata sp. nov. Caules graciles tetragoni in sectione, (angulis obtusis), sulcati, glabri, fuscentes. Folia opposita vel subalterna, petiolata, stipulata, oblongo-ovata, 9 cm. longa, 4½ cm. lata, apice acuta, vel acuminata, basi obtusa vel rotundata, trinervia, utrinque scaberula, venulis reticulatis impressis, margine serrata, (serris acutis ascendentibus), ima basi integra, petiolis gracilibus 2-3 cm. longis, stipulis acuminatis 1-nerviis 6 mm. longis, basi 1½ mm. latis. Spicæ monœciæ, axillares, solitariæ, 8-9 cm. longæ, sursum flores masculinos deorsum flores fœmineos gerentes, floribus ad nodos rhachis spicæ glomerulatis. Fl.

♀ : perianthium ventricosum 1 mm. longum, apice hirsutum 4-5 dentatum, ovarium includens. Ovarium biconvexum ovatum, stigmate elongato-filiformi unilaterali piloso spiraliter recurvo. Fl. ♂ : perianthium 4-partitum, segmentis ovatis apiculatis. Stamina 4, in alabastro inflexa. Achænia perianthio accrescente 2-costato inclusa biconvexa.

Hab. Taitō : Hakuhakusha, leg. T. Kawakami et Z. Kobayashi, Mai. 1906, (No. 1472, b.) ; Shiringai, leg. G. Nakahara, Juni. 1905, (No. 68).

Near *Bœhmeria diffusa* Wedd., but differs from it in the glabrous leaves with shorter petioles, and in the flowers.

Chamabaina Wight.

Chamabaina Morii Hayata sp. nov. Herba procumbens, ad nodos radicans, (internodiis 3 cm. longis), caulibus rubescentibus, hispidulis, subgracilibus. Folia opposita, petiolata, stipulata, ovato-rhomboidea, 1 cm. longa, 8 mm. lata, apice acuta, basi abrupte in petiolum attenuata, margine serrata basi integra, supra scabra, pilis longiusculis parce obtecta, subtus ad venas hirtella, petiolis 2-3 mm. longis, stipulis semioblongis $2\frac{1}{2}$ mm. longis $1\frac{1}{2}$ mm. latis scariosis. Fl. ♀ : Flores axillares ∝ - conferti, sessiles minuti, bracteis scariosis tenuibus obovatis, rotundatis, $\frac{1}{2}$ mm. longis, bracteolis lanceolatis $\frac{1}{2}$ mm. longis. Perianthium tubulosum ovarium includens, apice et facie ciliolatum, obscure lobatum. Ovarium obovoideum cum stylo $\frac{1}{2}$ mm. longum, stylo breve, stigmate oblongo dilatato barbato-penicillato.

Hab. Randaizan, leg. B. Hayata et U. Mori, Aug. 1908, (No. 7101).

Near *C. cuspidata* Wedd., but differs from it by the much smaller leaves with fewer teeth.

Pouzolzia Gandich.

Pouzolzia elegans Wedd.; Forbes et Hemsl. Ind. Fl. Sin. II. p. 489; Matsum. et Hayata Enum. Pl. Formos. p. 388.

Hab. Mamukutsu, leg. T. Kawakami et Z. Kobayashi, Aug. 1908, (No. 5593); Sensuizan, Suiteiryō, (No. 1212).

Juglandeæ.

Juglans Linn.

Juglans formosana Hayata sp. nov. Ramuli fulvescentes brevissime pubescentes, lenticellis angustissimis rubescentibus dispersi. Folia majuscula pinnata, 40 cm. longa, 18 cm. lata, oblonga in ambitu, pinnis lateralibus 7-8-jugis, jugis 3½ cm. a se remotis, petiolis 12 cm. longis, pinna terminali rhomboidea, minima, pinnis mediocribus maximis, inferioribus plus minus minoribus (pinnis mediocribus ellipticis 9 cm. longis 3 cm. latis apice cuspidatis basi rotundatis plus minus obliquis latere superiore rotundato-acutis inferiore plus minus cordatis margine minute serrulatis apice obtusis supra parce stellato-pilosis costis et venis tenuibus, subtus glaucis ad costas et venas dense, ad paginam densiuscule, stellato-tomentosis, costis et venis prominetibus, venis lateralibus utraque latere circ. 20, a costa angulo 70° egressis, sessilibus), petiolis 13 cm. longis cum rhachibus plus minus sulcatis, pubescentibus. Flores ignoti. Endocarpium lignosum, apiculatum 37 mm. longum 3 cm. latum dorso 3-striatum, inter strias profunde foveolato-rugulosum.

HAB. Taitō: Daironkōsha, leg. T. KAWAKAMI et U. MORI, 1906, Nov. (No. 2168).

Near *J. cordiformis* MAXIM. and *J. Sieboldiana* MAXIM., but differs from the former in having more minutely serrulated leaflets, and from the latter in the serration of the leaflets which are nearly rotundate, but not cordate, at the base.

Platycarya JUCC.

Platycarya strobilacea S. et Z. var. **Kawakamii** HAYATA v. n. Rami fusco-purpurascentes, longitudinaliter rugulosi, lenticellis minutis dispersi, cicatricibus foliorum majusculis late rotundatis, ramulis fusco-fulvis apice parcissime pilosis vel glabratis. Folia versus apicem ramorum alternatim approximatim disposita, pinnata, oblongo-obovata, vel oblonga in ambitu, 30 cm. longa, 12 cm. lata, pinnis utraque latere 8-12, oppositis, jugis 2-2½ cm. a se remotis pinna terminali iis lateralibus æquante, oblongo-lanceolata, 6 cm. longa, 2 cm, lata, apice acuminata, basi sessili, rotundata, vel leviter cordato-rotundata, margine serrulata, serrulis ascendentibus irregularibus. supra glabra ad costas tenuissime elevatas parce pubescente, subtus ad costas prominentes tementoso-pilosa, venis lateralibus distincte elevatis tenuibus utraque latere circ. 15 subrectis a costa angulo 60° divaricatis, interdum furcatis, ad apicem serrularum attingentibus, ad paginam subtus sub lente glandulis minutis punctiformibus dispersa, punctis flavis, pinnis inferioribus minoribus, infimis minis, (pinnas mediocres ⅓-plo æquantibus), 2 cm. longis, petiolis 4 cm. longis cum rhachibus brevissime pubescentibus basi leviter dilatatis incrassatis. Alabastrum foliorum acuto-globosum 5 mm. longum, perulis late triangularibus, dorso costatis apiculatis margine ciliolatis. Strobili terminales, oblongo-

cylindrici, 3 cm. longi, 11 mm. lati, brevissime stipitati, stipitibus 5 mm. longis, bracteis cuspidato-ovatis nucem superantibus valde imbricatis cuspidato-ovatis vel oblongis 5½ mm. longis 2½ mm. latis castaneis glabris margine ciliolatis incurvis. Nuces coroniformes, complanatæ apice emarginato-mucronatæ, vel obcordatæ, basi plus minus contractæ, 4 mm. longæ, cum alis 4½ mm. latæ, utrinque alatæ, medio angulo prominente instructæ.

Hab. Formosa, in Montibus Centralibus, leg. T. Kawakami.

Differs from the type in having much smaller leaflets, and narrower cones with a little broader bracts.

Myricaceæ.

Myrica Linn.

Myrica adenophora Hance var. **Kusanoi** Hayata sp. nov. Rami fusco-cinerascentes, longitudinaliter reticulato-rugosi, ramulis fuscis breve pubescentibus. Folia alterna subsessilia vel breve petiolata, tenuiter coriacea, obovato-oblonga 25-24 mm. longa 10-16 mm. lata, apice obtusa rotundata, vel emarginata cum mucronibus, basi cuneata, margine leviter revoluta, remote 2-3-mucronato-serrulata, supra glabra subtus subglabrata, vel minute glanduloso-punctata, punctis flavis, costis et venis utraque pagine prominulis, venis primariis utraque latere 4, a costa angulo 70° egressis, rectis prope marginem subito arcuatis anastomosantibus venis secundariis indistinctis, venulis reticulatis, petiolis brevibus 2 mm. longis. Flores spicati, spicis ad axillas foliorum superiorum. Spicæ ♂ 15 mm. longæ ascendentes vel nutantes, simplices vel interdum breve paniculato-ramosæ, ramis 3 mm. longis vel brevioribus. Fl. ♂ : sessiles, basi 1-bracteati, bracteis obtriangularibus 1 mm. longis 1⅓ mm. latis truncatis

mucronatis margine ciliolatis. Stamina 2-4, filamentis brevibus ½ mm. longis, antheris circ. globosis 1 mm. longis ¾ mm. latis rubro-cristato-punctatis. Spicæ ♀ : 12 mm. longæ, pubescentes, erectæ vel patentes, interdum breve paniculato-ramosæ, floribus 2-3 ad ramos approximate spicatim sitis. Fl. ♀ : supra bracteam solitarii vel 2-3 siti, bracteis late triangularibus 1 mm. longis extus glanduloso-punctatis margine ciliolatis ; perianthium 3-partitum, segmentis exterioribus 2 minoribus late rotundatis ciliolatis, segmento interiore et antico majore rotundato ciliolato ; glandulis minutis 3-4 ad basin ovarii sitis : ovarium extus papilloso-tuberculatum, stylo 2-partito, ramis complanatis apice acuminatis leviter plumosis. Drupa ellipsoidea 7 mm. longa, 5 mm. lata, extus ceraceo-lamellato-papillosa, lamellis carnosis obovoideis 1 mm. longis, totiusque latis apice mucronatis, endocarpio duro.

Hab. Rikushizan, Chōzan, leg. S. Kusano, Jan. 1909.

Very like *M. adenophora* Hance in Journ. Bot. (1883), p. 357, but quite distinguishable by the number of stamen which is usually 2-4, and by the leaves with fewer veinlets.

Cupuliferæ.

Fagus Linn.

Fagus Hayatæ Palib. sp. nov.

Fagus sp. var. Hayata Fl. Mont. Formos. in Journ. Coll. Sc. Imp. Univ. Tōkyō, XXV. Art.-19, p. 206.

Arbor (excelsa) ; folia adulta longepetiolata, elliptica basi plus minus cuneata, apice longe attenuata, margine supra medium breviter dentata vix undulata, utrinque fere glabra, lucida ; nervo medio prominulo, nervis secundariis (11-12) curvatis divergentibus in sinus

dentes obsoletos v. distinctos attingentibus. Flores et fructus ignoti sunt.

Hab. Kusshaku : Sōtenzan, ad 5600 ped. alt., N. Konishi, Feb. 1906, (spec. steril.).

The description above given was sent to me by M. J. Palibin for publication. The nearest kin of this plant is *Fagus japonica* Maxim.

Quercus Linn.

Quercus amygdalifolia Skan in Forbes et Hemsl. Ind. Fl. Sin. II. p. 506 ; Matsum. et Hayata Enum. Pl. Formos. p. 393.

Hab. Nantō : Mushazan, ad 6000 ped., leg. T. Kawakami et U. Mori, Aug. 1906, (No. 1194).

Observ. Rami glabri nigricantes, ramulis fusco-tomentosis validiusculis. Folia alterna, petiolata, lanceolata, 13 cm. longa, 28 mm. lata, acuminata, ad summum obtusa, basi acuta, integra, supra glabra, subtus adpresse tenuiter pubescentia, costis et venis supra planis leviter tomentellatis vel subglabris subtus prominentibus, venis primariis utraque 8 arcuatis prope marginem evanescentibus, venis secundariis tenuiter transversis, petiolis 18 mm. longis supra planis, stipulis caducissimis lanceolatis 1 cm. longis. Spicæ 1-2, ad apicem ramorum terminalium incrassatorum aphyllorum terminales, circ. 10 cm. longæ, erectæ incrassatæ, floribus dense spiraliter dispositis, partibus superioribus floribus ♂, inferioribus floribus ♀. Fl. ♂ : 7-8-aggregati, bracteati, bracteis triangularibus ; perianthium 6-partitum, segmentis ovatis tomentosis 1½ mm. longis. Stamina circ. 12, exserta, filamentis 2½ mm. longis, antheris cordatis, connectivis breve apiculatis. Rudimentum ovarii 3-4-lobulatum breve tomentosum. Fl. ♀ : 5-6-aggregati ; bracteis ∞ -seriatis valde imbricatis, perianthium 6-partitum, segmentis ovatis ovario fere adnatis, stylo tripartito.

Quercus brevicaudata Skan in Forbes et Hemsl. Ind. Fl. Sin. II. p. 508.

Hab. Shinkō : Agyokuzan, leg. T. Kawakami et K. Hino, Dec. 1905, (No. 5776) ; Uraisha, leg. N. Konishi, Feb. 1907, (No. 24, Fr.) ; ibidem. Mai. 1906, (Fl. ♂) ; Raga : leg. N. Konishi, Dec. 1908, (Fr.).

Observ. Rami nigricantes validiusculi, cicatricibus longitudinaliter notati, ramulis nigricantibus vel fusco-nigricantibus, 5-angulatis, angulis obtusis, facie sulcatis, validiusculis. Alabastrum foliorum 5-gonum pyramidale, 1 cm. longum, perulis caducissimis acutis. Folia alterna petiolata, elliptica 9-15 cm. longa, 3½-5½ cm. lata, apice cuspidato-acuminata, (cuspidibus 1½ cm. longis 3 mm. latis apice obtusis), basi rotundata, vel acuta, vix obliqua, margine integerrima, utrinque glabra, supra nitida, subtus pallidiora, costis supra sulcatis, subtus elevatis, venis primariis lateralibus supra planis subtus tenuiter elevatis untrinque 10 a costa angulo 50° egressis, prope marginem arcuatis evanescentibus, venis secundariis et venulis reticulatis, valde coriacea, petiolis 2½-4½ cm. longis supra sulcatis basi incrassatis. Spicæ florum masculinorum ad axillas foliorum summorum 5 cm. longæ graciles subnutantes. Fl. ♂ : perianthium irregulariter 6-partitum, segmentis obovatis ½ mm. longis extus barbatis ; stamina circ. 12, filamentis exsertis 2½ mm. longis, antheris orbicularibus, utrinque emarginatis. Rudimentum ovarii obovoideum ⅔ mm. longum, obscure 3 lobatum apice barbatum. Fructus ad rachin validam spicatim dispositi. Cupula matura patelliformis 4 mm. longa, 17 mm. in diametro, (partibus marginalibus 3 mm. latis, partibus centralibus elevatis planis 1 cm. in diametro), intus extusque tenuiter depresso-pubescens, extus squamis 7-seriatim dispositis adnatis triangularibus cuspidato-acutis 1½ mm. longis. Glans late turbinato-globosa, 2 cm. longa, 22 mm. lata, apice brevissime acuta,

apiculata, basi truncata, cicatricibus parvis, glandem in diametro ½-plo æquantibus profunde depressis planis, castanea.

Quercus Calresii Hemsl. in Hook. Ic. Pl. t. 2591; Forbes et Hemsl. Ind. Fl. Sin. II. p. 509.

Hab. Taiko, leg. T. Kawakami et B. Hayata, 1908, Aug. (No. 46).

Distrib. Fokien.

Exactly agrees with the figure above cited, excepting that this plant (Formosan) has a quite sessile fruit, while the other (Chinese) has always short stalked one.

Quercus Championi Benth. Fl. Hongk. p. 321 ; DC. Prodr. XVI. -2, p. 94 ; Forbes et Hemsl. Ind. Fl. Sin. II. p. 509 ; Matsum. et Hayata Enum. Pl. Formos. p. 393.

Hab. Kōshūn : Hieranzan, leg. S. Kusano, Jan. 1909.

Distrib. Hongkong.

Observ. Rami adpresse fusco-pubescentes, cinerascentes, ramulis angulatis facie sulcatis. Folia alterna, petiolata, ad nodos approximate disposita, valde coriacea, oblongo-obovata 6½ cm. longa, 2½ cm. lata, apice obtusa basi gradatim attenuata, margine integerrima, leviter revoluta, supra nitida, subtus dense brevissime pilis stellatis indumentis obtecta, costis et venis supra impressis, subtus prominentibus, venis primariis utrinque latere 8 a costa angulo 50° egressis rectis prope marginem arcuatis evanescentibus, venis secundariis et venulis indistinctis, petiolis 12 mm. longis adpresso-pilosis supra sulcatis, (folia novella utraque pagine dense adpresse pilis stellatis fusco-flavescentibus obtecta), stipulis lineari-filiformibus 8 mm. longis. Spicæ ad axillas foliorum summorum approximatorum dispositæ, erecto-nutantes, spicibus florum masculinorum inferioribus, femineorum suprioribus. Fl. ♂ : sessiles 1-bracteati, bracteis

triangularibus pilis fusco-flavescentibus dense obtectis ½ mm. longis. Perianthium cupuliforme, 3 mm. in diametro, subplanum obscure tenuiterque 5-6-lobatum, pilosum extus fusco-flavescens. Stamina 12, subsessilia vel filamentis brevibus, antheris globosis pilis stellatis dense obtectis. Rudimentum ovarii O. Fl. ♀ : 1-bracteati ; perianthium 6-partitum, segmentis 2-seriatim dispositis, extus pilosis ; stylus 3-partitus, ramis brevibus, stigmatibus capitellatis interiore tenuiter 2-lobulatis. Cupula late obconica campanulata, 22 mm. longa, ore 28 mm. in diametro truncato, basi rotundata, extus dense sericeo-villosa, fusca, 10-annulata, annulis prominentibus subglabratis, inter annulos sericeo-floccoso-tomentosa, intus ferrugineo-fuscente dense sericeo-tomentosa, pilis rectis patentibus. Glans cupula semi-involucrata, obovata, oblonga, vel longe globosa, 23 mm. longa, 18 mm. lata, apice breve apiculata, basi rotundata, vel leviter contracta, primum sericeo-tomentosa, demum glabrata, castanea, cicatricibus planis vel leviter convexis glandem ⅔-plo in diametro æquantibus leviter rugosis prope marginem minute 13-cicatricosis.

The present plant is near *Q. pachyloma* O. SEEM. in the shape of the cone and cupule. The cupule of this plant is far larger than that of the other species. The former differs from the latter in having oblong, obtuse, and entire leaves. The leaves of *Q. pachyloma* are acute and dentate at the apex. I suspect if HENRY's No. 1367 mentioned in Ind. Fl. Sin. II. p. 519, under the name of *Q. pachyloma* SEEM. may not be this species.

Quercus Ilex LINN. var. **spinosa** FRANCHET in "Journ. de Botanique, (1899), p. 152" ; FORBES et HEMSL. Ind. Fl. Sin. II. p. 516.

HAB. in Montibus Centralibus, ad 11000 ped. alt., leg. T. KAWAKAMI et U. MORI, Nov. 1906, (No. 1857).

DISTRIB. Hupeh, Shensi, Kansuh., Szechuen.

Quercus impressivena Hayata sp. nov. Rami nigricantes, lenticellis minutis notati, cicatricibus foliorum elevato-depressis, ramulis 5-gonis, angulis obtusis, faciesulcatis, basi perulis persistentibus triangularibus ∞ -seriatis instructis. Folia alterna petiolata stipulata oblongo-lanceolata 11 cm. longa 42 mm. lata apice acuminata, (acuminibus angustis 15 mm. longis 3 mm. latis apice obtusis), basi acuta cuneata vel rotundata supra venis impressis subtus prominentibus, primariis utrinque latere 10, a costa angulo 70° egressis prope marginem arcuatis evanescentibus, venis secundariis et venulis tenuissimis reticulatis, costis subtus valde elevatis, utrinque glabra coriacea, petiolis 2 cm. longis basi calloso-incrassatis. Spicæ terminales geminæ, validiusculæ, breve villosæ, 14 cm. longæ, laxifloratæ, floribus ♀ geminatis ternatis vel solitariis. Fl. ♀ : sessiles, bracteis ∞ -seriatis involucrati, bracteis triangularibus pubescentibus, stylo 3-partito, ramis vix recurvis.

Hab. Hokkōkei, leg. C. Owatari, Jan. 1898.

Near *Quercus Henryi* Seem., but differs from it by the sessile, female flowers, and smaller leaves.

Quercus lepidocarpa Hayata sp. nov. Ramuli validiusculi fusco-cinerascentes lenticellati angulati, (angulis obtusis), facie sulcati. Alabastrum foliorum oblongum vel globosum acutum fusco-castaneum, perulis triangularibus. Folia alterna petiolata obovato-oblonga 18 cm. longa 6½ cm. lata apice breve cuspidata, (cuspidibus plerumque 1 cm. longis apice obtusis), basi rotundato-acuta margine sursum obtuse dentata deorsum integra utrinque glabra, costis supra basi sulcatis subtus prominente elevatis, venis supra impressis subtus prominentibus, venis primariis utrinque latere circ. 10 a costa angulo 70° egressis arcuatis prope marginem gracilibus anastomosantibus, venis secundariis tenuissimis oblique transversis, venulis utrinque reticulatis, petiolis 1½ cm. longis supra sulcatis basi calloso-

incrassatis. Involucrum fructiferum truncato-globosum solitarium vel 2-3-connatum 2½ cm. in diametro glandem perfecte includens apice truncatum basi breve attenuatum intus glabrum extus bracteis accrescentibus spiraliter dense instructum, bracteis tuberculiformibus triangularibus adnatis inferioribus latioribus superioribus gradatim angustioribus minoribus falcatis acutis extus margine carinato-elevatis intus profunde depressis vel sulcatis. Glans late globosa 1½ cm. in diametro, apice truncato-depressa, medio apiculata, (stylo brevi persistente), basi rotundata, involucro perfecte inclusa, endocarpio confluens.

Hab. Taitō : Inikufukusha, leg. T. Kawakami et U. Mori, Dec. 1906, (No. 2164).

Near *Quercus confragosa* (King. t. 71), from which the present plant differs in having acute scales of the involucres and the obscurely dentate leaves. This is still nearer *Q. cleistocarpa* Seemen, from which it is distinguishable by the much larger leaves which are obscurely dentate towards the apex, and by the much more prominent scales of the cones.

Quercus longinux Hayata sp. nov. Rami et ramuli graciles fusco-nigricantes lenticellis minutis notati. Folia alterna ad nodos approximate disposita petiolata oblongo-lanceolata 8 cm. longa 16 mm. lata apice acuminata, (acuminibus 2 cm. longis), basi acutis margine a medio deorsum integra, sursum (præter acumina) tenuiter serrata, (serris acutis aristatis), tenuiter coriacea, costis supra planis sulcatis, costis et venis subtus prominentibus, venis primariis utrinque latere 7-8 tenuissimis prope marginem evanescentibus vel ad apicem serrarum attingentibus, supra nitida subtus glauca, petiolis 1 cm. longis supra sulcatis basi calloso-incrassatis. Cupula late semigloboso-campanulata, glandem in longitudine usque ad ¼ inclu-

dens. Glans ellipsoidea 16 mm. longa 9 mm. lata apice acuta basi rotundata usque ad $\frac{1}{4}$ in longitudine a cupula involucrata, cicatricibus minoribus 4 mm. in diametro.

Hab. Shinkō : Uraisha, leg. T. Kawakami et U. Mori, Juli. 1906, (No. 1384).

Near *Q. myrsinæfolia*, but differs in having much longer glans and much narrower leaves. Cupules are wanting in this specimen and the description here given is not satisfactory.

Quercus Morii Hayata sp. nov. Rami ramulique validiusculi cineraceo-nigricantes longitudinaliter rugosi lenticellis minutis fuscis oblongis parce dispersi. Alabastrum foliorum oblongum 5-gonum, perulis ∞-seriatim imbricatis rotundato-triangularibus. Folia alterna petiolata oblonga $8\frac{1}{2}$ cm. longa 4 cm. lata apice acuta vel breve acuminata basi rotundata sursum gradatim serrata, (serris breve mucronatis), utraque glabra, costis et venis supra sulcatis, venulis reticulatis sensim depressis, subtus costis elevatis venis planis, venis primariis utrinque latere 13 rectis a costa angulo 50° egressis ad apicem serrularum attingentibus, petiolis 18 mm. longis. Fructus ad rachin validiusculam dispositi. Cupula fructifera præmatura glandem subincludens turbinata 1 cm. longa 13 mm. lata extus sericeo-tomentosa (pilis brevibus fuscis) 8-annulata intus sericeo-tomentosa, pilis longioribus fuscentibus. Glans præmatura globosa, apice contracta apiculata, cicatricibus parvis glandem $\frac{1}{2}$-plo in diametro æquantibus.

Hab. in monte Morrison, ad 6500 ped. alt., leg. T. Kawakami et U. Mori, Oct. 1906, (No. 2192).

Somewhat like *Q. acuta* Thunb., in its cupules and leaf-buds, but differs from it by the leaves which are rounded at the base, and impressively veined.

Quercus nantœnsis Hayata sp. nov. Rami fusco-purpurascen-

tes subglabrati, lenticellis prominentibus notati ramuli complanati prominente angulati. Folia tenuiter coriacea lanceolata 16 cm. longa 3½ cm. lata apice acuminato-cuspidata, (cuspidibus subfalcato-recurvatis linearibus 3-4 cm. longis 2-3 mm. latis), basi cuneato-attenuata in petiolum 1-2 cm. longum abeuntia, margine undulato-revoluta vel integra supra glabra exsiccato fulvo-pallida glaberrima, costis prominentibus basin complanatis, venis rectis tenuissimis planis, venulis minute reticulatis, subtus sub lente tenuissime denseque adpresse-glauco-pubescentia demum subglabrata, sub microscopio inter reticula minute pubescentia, costis subtus planis venis et venulis primum inconspicuis demum distincte reticulatis, petiolis 1-2 cm. longis complanatis subalatis, alis angustissimis. Spicæ floris ♂ ad axillas foliorum superiorum solitariæ vel ad apicem ramorum approximate dispositæ erecto-recurvatæ 6 cm. longæ. Fl. ♂ sessiles secus rhachin 2-3-aggregati. Perianthium 6-fidum, extus dense pubescens, segmentis ovatis crassiusculis intus glabris 1 mm. longis. Stamina circ. 10, longe exserta 2 mm. longa, filamentis filiformibus basi perianthii affixis, antheris late globosis apice rubro-apiculatis basi cordatis. Spicæ ♀ ut ♂. Fl. ♀ : subsessiles, secus rhachin 3-glomerati, perianthiis basi connatis, in stipitem incrassatum 1 mm. longum confluentibus. Ovarium conico-globosum segmentis ovatis perianthii involucratum apice villosum, stylis 3 distinctis glabris ⅔ mm. longis digitiformibus.

Hab. Nantō : Hinokiyama, leg. T. Kawakami et U. Mori, 1907, Juli. (No. 3399) ; Nantō : Shizōsan, 1906, (No. 1157).

Somewhat resembles *Q. amygdalifolia* Sкan, but differs from it in having leaves with very faint primary veins which are slightly curved towards the apex, and with a midrib elevated on the upper surface, and also in having very much slender spikes of male flowers.

Quercus pseudo-myrsinæfolia Hayata sp. nov. Rami ramulique nigricantes, lenticellis minutis parce notati. Alabastrum foliorum oblongum 5-gonum acutum 4 mm. longum, perulis ∞-seriatis triangularibus obtusis minutis. Folia alterna petiolata coriacea oblongo-lanceolata 8 cm. longa 2 cm. lata apice longe acuminata, (acuminibus 13 mm. longis 2-3 mm. latis), basi acuta margine a medio deorsum integra sursum (præter acumen) serrata, serris recurvis obtuso-aristatis, costis et venis supra sulcatis, subtus costis elevatis venis subplanis, tenuissimis, venis primariis lateralibus utraque 9 rectis a costa angulo 30° egressis tenuissimis vix arcuatis ad apicem serrarum attingentibus, petiolis 2 cm. longis. Cupula breve cyathiformis 1 cm. in diametro, 5 mm. longa, extus 4-annulata, intus extusque breve tenuiter sericeo-pubescens, glandem circ. usque ad $\frac{1}{3}$ in longitudine includens; glans globosa 12 mm. longa, 1 cm. lata, apice contracto-acuta, basi late truncata, (cicatricibus elevatis convexis parvis glandem in diametro $\frac{1}{2}$-plo æquantibus).

Hab. Heirinbi: Shishi-Kyakukōzan, leg. N. Konishi, Nov. 1902, (No. 22); Shinkō: Agiyokuzan, leg. T. Kawakami et K. Hino, Dec. 1905, (No. 5779).

Near *Q. myrsinæfolia*, from which the present plant is easily distinguished by much shorter acorns, and narrower leaves which are usually dark purple in dried specimens.

Quercus randaiensis Hayata sp. nov. Rami ramulique graciles, longitudinaliter reticulato-rugosi, non lenticellati fusco-cinerascentes. Folia tenuiter coriacea alterna sub-sessilia vel breve petiolata ovato-oblonga 10 cm. longa $3\frac{1}{2}$ cm. lata apice obtuso-acuminata basi acuta margine integra utrinque glabra, costis venisque supra planis subtus elevatis, venis primariis untrinque latere 9 rectis a costa angulo 60° egressis tenuissimis prope marginem arcuatis anas-

tomosantibus, venis secundariis indistinctis inter venas primarias depresso-reticulatis, utraque glabra pallidiora, petiolis brevissimis vix 1 mm. longis calloso-incrassatis. Perulæ alabastrorum foliorum ad basin rumuli persistentes, scariosæ triangulares 4 mm. longæ Fructus maturi ad rachin spicæ spicatim dispositi, rachibus validiusculis 7 cm. longis. Cupula patelliformis vel breve cyathiformis, basi glandis sita, 3 mm. longa, 8 mm. in diametro utrinque facie tenuiter pubescens, extus squamulis ∞-seriatis adnatis planis triangularibus imbricatis instructa. Glans ovata 9 mm. longa 7 mm. lata, apice apiculata basi truncata, (cicatricibus parvis planis glandem in diametro $\frac{1}{2}$-plo æquantibus).

Hab. Tokunsha, ad pedem montis Randai, leg. S. Kusano, Feb. 1909.

Quercus sessilifolia Blume ; Forbes et Hemsl. Ind. Fl. Sin. II. p. 521.

Hab. Giran, Chūreizan, ad 3700 ped. alt., leg. N. Konishi, Aug. 1907, (No. 42).

Quercus taichuensis Hayata sp. nov. Rami grisei sed hac atque illac cinerascentes, ramulis basi cicatricibus approximatim annulatim instructis, lenticellis minutis densiuscule notatis. Alabastrum foliorum ovato-pyramidale, pentagonum, 5 mm. longum obtusum, perulis ovatis 3 mm. longis obtusis castaneis margine ciliolatis. Folia oblongo-lanceolata 6 cm. longa 16 mm. lata apice cuspidato-acuminata obtusa basi acuta margine sursum remote serrulata, sed in cuspidem et a medio deorsum integra, (serrulis setiformibus $\frac{1}{2}$ mm. longis 3 mm. a se remotis), supra nitida glaberrima, exsiccato fulva, costis et venis distincte impressis, subtus glauca costis prominentibus venis lateralibus primariis distincte tenuissime prominulis, petiolis $1\frac{1}{2}$ cm. longis supra subsulcatis.

Hab. Taichū. Kashigatani, leg. G. Nakahara.

There is nothing like this at Kew. As the plant is very distinct in the shape of leaves and leaf-buds, I have thought it better to describe it, though the specimen is very imperfect.

Quercus taitœnsis Hayata sp. nov. Rami cinerascentes, ramulis adpresso-cinereo-pubescentibus. Folia alterna petiolata oblonga vel obovato-lanceolata vel oblongo-lanceolata 11 cm. longa 3½ cm. lata apice acuminata basi acuta in petiolum attenuata margine integra vel obscure repandata utrinque pagine subglabrata sub microscopio tenuissime depresso-pubescentia, costis et venis supra depresso-sulcatis subtus elevatis, venis primariis utrinque latere 8 a costa angulo 30° egressis prope marginem subito arcuatis evanescentibus, petiolis 1½ cm. longis. Spicæ erectæ, ad axillas foliorum summorum, validiusculæ 11 cm. longæ, partibus inferioribus floribus masculinis, superioribus fœmineis. Fl. ♂ : 4-5 aggregatim dispositi ; perianthium 6-partitum, segmentis 1 mm. longis ovatis extus pilosis intus tenuiter pubescentibus rubescentibus. Stamina 12 exserta. Rudimentum ovarii depresso-globosum apice dense barbatum. Fl. ♀ : 5-4-aggregatim dispositi, involucris prominentibus ; perianthium 6-partitum, segmentis adpressis ; stylus tripatitus, ramis erectis. Fructus maturi ad rachin spicatim 2-3 aggregatim vel distinctim dispositi. Cupula peltata vel patelliformis 4 mm. longa 9 mm. in diametro æquans, intus tenuissime pubescens, partibus marginalibus 3 mm. latis, partibus centralibus elevatis planis in diametro cupulam ½-plo æquantibus, extus cinerascens tuberculata. Glans ovoidea apice acuta apiculata basi rotundata 1½ cm. longa 12 mm. lata, (cicatricibus parvis profunde depressis planis), extus castanea.

Hab. in Montibus Centralibus, leg. T. Kawakami et U. Mori, Nov.

1906, (No. 2216) ; Taitō : Iryokukakusha, leg. T. KAWAKAMI et U. MORI, Dec. 1906, (No. 2187).

Near *Q. polystachya* WALL. (KING. t. 44), from which the present plant is quite distinguishable by the shape of glans which is ovoid, acute at the apex and round at the base. Also very like *Q. thalassica* HANCE, but differs from it by the smaller cups with more elevated central scars, and more obscure marginal rings, and by the larger leaves.

Quercus ternaticupula HAYATA sp. nov. Rami fusco-nigricantes, lenticellis minutis dispersi, cicatricibus foliorum et ramulorum notati, ramulis teretibus breve pubescentibus. Folia alterna breve petiolata stipulata, oblongo-elliptica, 12 cm. longa, 4 cm. lata, apice abrupte breveque acuminata ad summum obtusa basi acuta margine integra vel obscure repandata utraque pagine glabra, costis venisque supra prominentibus vel planis subtus elevatis, venis primariis utrinque 14 a costa angulo 60° egressis, venis secundariis et venulis distincte reticulatis, tenuiter coriacea, petiolis 1 cm. longis supra planis basi incrassatis, stipulis caducissimis linearibus 4 mm. longis. Spicæ dense cineraceo-pubescentes terminales, erectæ validiusculæ vel ad axillas foliorum summorum 6 cm. longæ, partibus superioribus floribus masculinis, partibus inferioribus fœmineis. Fl. ♂ : 3-4-aggregati ; perianthium 6-partitum, segmentis 2-seriatim dispositis, ovato-rotundatis, ¾ mm. longis, extus dense intus parce pubescentibus. Stamina 12, filamentis longe exsertis 3 mm. longis. Rudimentum ovarii convexum apice barbatum. Fl. ♀ : 3-4-fasciculati, fasciculis 1-bracteatis, bracteis triangularibus apice cuspidatis. Involucrum late globosum, squamis brevibus ∝ - seriatis ; perianthium 6-partitum, segmentis 2-seriatim ovario adnatis ; stylus 3-partitus, stigmate punctiformi ; rhachis spicæ ad nodos tumescens. Fructus maturi ad rachin accrescentem spicatim ternatim vel abortu geminatim dispositi.

Cupula cyathiformis 1 cm. longa 14 mm. in diametro glandem usque ad $\frac{1}{6}$ in longitudine includens, (extus annulariter tuberculis 8-seriatim dispositis tuberculis cuneatis sæpe connatis annulos multi-seriatos formantibus), intus extusque breve cineraceo,- pubescens, partibus marginalibus 5 mm. latis, partibus centralibus 6 mm. in diametro cupulam in diametro $\frac{1}{2}$-plo æquantibus elevatis. Glans ellipsoidea 19 mm. longa 14 mm. lata apice rotundata basi rotundato-truncata, (cicatricibus parvis glandem $\frac{2}{5}$-plo in diametro æquantibus depressis).

Hab. Uraisha, leg. N. Konishi, Aprili. 1908, (No. 105); Nantō: Jinrinsha, leg. T. Kawakami et U. Mori, Juli. 1907, (No. 3402).

Near *Q. thalassica*, from which the present plant differs in having entire acuminate or even cuspidate leaves, and acorns which are round at the apex. The acorns of *Q. thalassica* are acute at the apex.

Quercus uraiana Hayata sp. nov. Rami ramulique fusco-cinerascentes, longitudinaliter reticulato-rugosi. Alabastrum foliorum acutum biconvexum 5 mm. longum, perulis 2-seriatim dispositis plicatis triangularibus 3 mm. longis. Folia alterna petiolata lanceolata vel oblongo-lanceolata 10 cm. longa 23 mm. lata apice longe acuminata vix obliqua basi acuta vel rotundata obliqua margine a medio deorsum integra sursum (præter acumen) obscure serrata, (serris obtusis), costis elevatis, venis primariis tenuissimis venis secundariis et venulis indistinctis, utraque pagine glabra, supra nitida, subtus pallidiora, petiolis 8 mm. longis basi callosoincrassatis. Fructus maturi ad rhachin spicatim siti, distincti. Cupula cyathiformis 5 mm. longa 10 mm. lata utrinque tenuiter sericeo-pubescens extus squamis 5-seriatim instructa, squamis cuspidato-triangularibus acutis apice carinatis 1 mm. longis. Glans late ovata 9 mm. longa, 8 mm. lata, apice apiculata basi truncata, extus primum pubescens demum subglabrata, cicatri-

cibus planis vel vix concavis glandem in diametro $\frac{2}{3}$-plo æquantibus.

Hab. Uraisha, leg. N. Konishi et S. Kusano, Dec. 1908.

Near *Quercus randaiensis*, from which the present plant is easily distinguished by the long-petioled leaves which are acuminate and dentate, and by the much deeper cupules.

Castanopsis Spach.

Castanopsis brevispina Hayata sp. nov. Rami nigro-rubescentes, longitudinaliter rugosi lenticellis parce notati, ramulis fusco-tomentosis. Folia alterna breve petiolata ovato-lanceolata 10 cm. longa 32 mm. lata apice gradatim acuminata, (acuminibus gracilibus 1 cm. longis 1–1½ mm. latis), basi rotundata brevissime ad petiolum attenuata, supra glabra, subtus pilis adpressis tenuiter vel dense tomentellata fusco-flavescentia ad costas et venas pilis longis erectis parce dispersa, supra costis impressis venis planis, subtus costis prominente venis primariis leviter elevatis, venis primariis utrinque latere 11, a costa angulo 60° egressis arcuatis prope marginem anastomosantibus, venis secundariis utrinque pagine inconspicuis oblique transversis, margine integra sæpius sursum infra acumen tenuiter 2-3-serrata, (serris obtusis), acuminibus integris, coriacea, petiolis ½ cm. longis supra sulcatis. Involucrum fructiferum auctum late globosum cum spinis 2½ cm. longum, extus aculeis fasciculatis (fasciculis 5 mm. longis) et ramosis validis dense echinatum, intus pilis rectis dense sericeo-tomentosum, irregulariter fissum. Nuces involucro 2-3 inclusæ, angulares ∞-costatæ dense sericeo-pilosæ fusco-rubescentes ovoideo-pyraminales 12 mm. longæ.

Hab. Hieranzan, leg. S. Kusano, Jan. 1909.

Near *C. tribuloides* var. *echinocarpa*, but differs from it in the leaves which have less conspicuous primary and secondary veins.

Castanopsis Kawakamii Hayata sp. nov. Rami teretes, cortice

nigricante rugoso, lenticellis minutis transverse longis dispersi, supra cicatricibus late globosis foliorum cicatricibus ramorum majoribus elevato-depressis notati. Folia coriacea alterna petiolata longe ovata 8½ cm. longa 32 mm. lata cuspidato-acuminata, (acuminibus 1 cm. longis 3 mm. latis), basi rotundata vel acuta vix obliqua margine integra infra acumen paullo serrata vel omnio integra, supra nitida, subtus primum tenuiter adpresse pubescentia interdum argenteo tenuissime pubescentia demum subglabrata, costis et venis supra planis subtus elevatis, venis secundariis utrinque latere 7 a costa angulo 40° egressis vix arcuatis prope marginem evanescentibus, venis secundariis inconspicuis, venulis minute reticulatis inconspicuis, petiolis longioribus 2 cm. longis supra planis subtus rotundatis basi calloso-incrassatis. Spicæ fructiferæ incrassatæ. Fructus 5-6, spicatim dispositi, sed maturo in unum reducti. Involucrum fructiferum late globosum cum spinis 6½ cm. longum 4½ cm. latum, spinis fasciculatis et ramosis echinatum, (spinis basi pauce ramosis, rectis 2 cm. longis) apice irregulariter 4-5 fissum intus pilis sericeis adpresse obtectum. Nuces solitariæ involucro inclusæ late ovato-globosæ 17 mm. longæ 20 mm. latæ tenuiter sericeo-pubescentes apice breve apiculatæ basi truncato-rotundatæ, (cicatricibus globosis 16 mm. in diametro rugosis convexis).

Hab. Horisha ; Shōhakurin, leg. N. Konishi, (No. 38) ; Nantō : Naibunsha, leg. G. Nakahara, Feb. 1907 ; Suisha, Nankōkei, leg. T. Kawakami et U. Mori, Aug. 1906, (No. 1196) ; Giochi, leg. Y. Shimada, Dec. 1907, (Nos. 5171 et 5170) ; Biōritsu : Sensuizan, leg. T. Kawakami et U. Mori, Oct. 1908 ; Randaizan, leg. T. Kawakami et U. Mori, Juli. 1907, (No. 3300).

Near *C. javanica* A. DC., but quite distinguishable by the fruits covered with straight, but not curved, spines and quite glabrous leaves with fewer primary lateral veins.

Castanopsis Kusanoi HAYATA sp. nov. Rami fusco-nigricantes lenticellis parce obtecti glabrati. Folia alterna petiolata oblongo-lanceolata 18 cm. longa 5 cm. lata longe acuminata, (acuminibus angustissimis 2 cm. longis), basi acuta margine integra sub acumini obscure pauceque dentata vel omnia integra, costis supra impressis subtus prominentibus, venis supra planis subtus elevatis, venulis reticulatis utrinque pagine prominulis, venis primariis utraque 5-6 a costa angulo 50° egressis arcuatis prope marginem evanescentibus vel obscure anastomosantibus, utrinque glabra exsiccato supra cinereo-pallida, subtus pallido-flavescentia, petiolis brevibus 8 mm. longis. Alabastrum foliorum ovoideum acutum, perulis ovatis 2 mm. longis. Involucrum fructiferum late globosum cum spinis 4½ cm. latum, spinis fasciculatis dense echinatum, (echinis, 8 mm. longis), intus tenuiter sericeo-pubescens. Nuces 3 involucro inclusæ globoso-pyramidales apiculatæ tenuiter pubescentes vel subglabratæ, cicatricibus planis vel leviter convexis.

HAB. Punchiō, ad pedem montis Arizan, leg. S. KUSANO, Feb. 1909.

Near *C. diversifolia* KING. (t. 85, A), from which this is quite distinguishable by the lanceolate leaves with inconspicuous secondary veins. Very near *C. argentea* var. *β. martabanica* A. DC. ; but the leaves of the present plant are thinner and less coriaceous, the petioles are much shorter, and primary lateral veins are fewer.

Castanopsis stellato-spina HAYATA sp. nov. Rami rubro-nigricantes cicatricibus foliorum et ramulorum notati, lenticellis oblongis pauce dispersi, basi ramuli perulati, perulis scariosis coriaceis triangularibus obtusis 5 mm. longis. Alabastrum foliorum ovatum 1 cm. longum acutum, perulis scariosis coriaceis persistentibus triangularibus, extus sericeo-pubescentibus. Folia alterna petiolata

ovato-lanceolata 9½ cm. longa 3 cm. lata apice acuminata basi rotundato-acuta margine integra sub acumine pauce obscureque serrata, supra glabra subtus dense adpresse tenuiter pubescentia, costis supra sulcatis subtus costis et venis prominentibus, venis primariis utrinque 11 a costa angulo 50° egressis leviter arcuatis prope marginem evanescentibus, venulis inconspicuis, crassiusculo-coriacea, petiolis 13 mm. longis supra sulcatis subtus rotundatis basi calloso-incrassatis. Involucrum fructiferum depresso-globosum nucem includens extus echinatum cum spinis 2½ cm. longum 5½ cm. in diametro, spinis validiusculis fasciculatis et ramosis vel spinis stellato-ramoso-fasciculatis, fasciculis 1½ cm. longis supra medium irregulariter bi-trifidis vel variis, spinis recurvis, intus pilis longiusculis adpresse dense sericeo-pubescens. Nuces 3 in involucro inclusæ, a latere depressis, curvatis, centrali matura globoso-trigono-pyramidalis 18 mm. longa totiusque lata apice breve apiculata basi truncata, (cicatricibus planis rugosis), facie tenuiter pubescentibus.

Hab. Banchoryō : Hieranzan, leg. S. Kusano, Jan. 1909.

The present plant differs from *C. Kusanoi* et *C. brevispina* in having recurved and somewhat stellately branched spines which are more incrassate than the preceding species.

Castanopsis taiwaniana Hayata Fl. Mont. Formos. p. 205.

Hab. Shintiku : Goshizan, leg. T. Kawakami, 1907, (No. 5124).

As the original description of this species gives no account of flowers, the following lines may properly be added here.

Flores monœcii spicatim paniculati, paniculis ad axillas foliorum summorum vel terminalibus 10 cm. longis a basi ramosis, ramis erecto-ascendentibus. Spicæ fœmineæ et masculinæ in unica panicula mixtæ, sæpe ramis inferioribus masculinis, ramis superioribus

fœmineis, ramis 6 cm. longis laxe floratis, perulis basi panicularum ∞-seriatim dispositis imbricatis scariosis coriaceis globosis 4 mm. longis, bracteis basi spicæ longe triangularibus crassiusculis 7 mm. longis 4 mm. latis extus ferrugineo-adpresse-tomentosis apice obtusis. Fl. ♂ : basi perianthii 1-2-bracteati, bracteis late rotundatis tomentosis, perianthium 6-partitum, (segmentis ovatis apice rotundatis 1½ mm. longis), extus subglabrum, intus medio tomentosum. Stamina 12-13, filamentis exsertis 4 mm. longis, antheris cordatis apice emarginatis. Rudimentum ovarii depresso-complanatum obscure lobatum apice planum barbatum 1 mm. in diametro. Fl. ♀ : bracteis ∞-seriatis valde imbricatis ; perianthium 6-partitum, segmentis ovatis obtusis ½ mm. longis ⅓ mm. latis ad ovarium adpressis, extus glabris intus tomentosis valde imbricatis ovarium fere includentibus. Rudimenta staminum 12 minuta basi segmentorum affixa. Ovarium globosum ½ mm. longum, dense pilosum, stylo 3-partito, ramis recurvis ½ mm. longis.

Castanea Gærtn.

Castanea sativa Mill. var. **formosana** Hayata sp. nov. Rami nigricantes glabrati lenticellis albis punctati. Folia alterna petiolata stipulata oblongo-lanceolata apice gradatim acuta basi rotundata vel truncata obliqua latere altero rotundata altero paullo cordata, margine tenuiter remoteque serrulata, (serrulis aristatis, aristis 2 mm. longis), costis supra planis pubescentibus, subtus prominentibus, venis primariis lateralibus utraque 18 a costa angulo 60° egressis rectis ad apicem serrularum attingentibus, venis secundariis oblique transversis, supra glabra, subtus dense breve adpresse pubescentia, petiolis 17 mm. longis, stipulis caducis cordato-ovatis obtusis 13 mm. longis. Spicæ terminales vel axillares 15 cm. longæ. Flores 5-6 glomerulati, glomerulis secus rachin spicæ spiraliter dispositis.

Perianthium 6-partitum, segmentis 2-seriatis omnibus tomentoso-pubescentibus crassiusculis intus tomentosis margine scariosis exterioribus late ovatis 1 mm. longis $1\frac{1}{2}$ mm. latis rotundatis interioribus obovatis $1\frac{1}{2}$ mm. longis 1 mm. latis. Stamina 12, longe exserta, 6 segmentis perianthii opposita, 6 iis alterna, filamentis filiformibus 6 mm. longis glabris, antheris late rotundatis $\frac{1}{3}$ mm. longis. Rudimenta carpellorum 6 obovoidea $\frac{2}{3}$ mm. longa apice barbata segmentis perianthii opposita. Fl. ♀ : ignoti.

Hab. Nantō: Horisha, leg. T. Kawakami et Y. Shimada, Aug. 1907.

I have examined all the species of the genus at Kew, but have not been able to find any thing like the present plant. There is a specimen labelled *C. sativa* in the Herbarium at Hongkong, which specimen is exactly the same as the Formosan plant, but quite different from the type of the named species.

Salicineæ.

Salix Linn.

Salix tetrasperma Roxb. var. **Kusanoi** Hayata n. v. Rami validiusculi fusco-rubescentes longitudinaliter rugosi non lenticellati, ramulis dense fusco-pubescentibus. Folia decidua alterna petiolata chartacea ovata vel ovato-oblonga 6-8 cm. longa 3-4 cm. lata apice breve cuspidato-acuminata, (acuminibus 3-10 mm. longis), basi rotundata brevissime minute cordata margine obscure crenulata vel serrulata vel subintegra supra glabra subtus tenuiter brevissime dense pubescentia, costis supra planis subtus prominentibus, venis primariis utrinque planis distinctis vel supra distincte subtus tenuiter prominentibus utrinque latere 20-25 a costa angulo 60° egressis leviter arcuatis prope marginem ascendentibus evanescentibus, venis secundariis utrinque pagine vix elevatis oblique transversis, venulis minute reticulatis distinctis, petiolis

1 cm. longis supra planis basi haud incrassatis, stipulis minutis circ. obsoletis triangularibus ½ mm. longis. Alabastrum florum supra cicatrices foliorum deciduorum situm globoso-ovatum ⅔ cm. longum, perulis rubris glabris 4-5 seriatim sitis oppositis, exterioribus ovatis 7 mm. longis, interioribus foliaceis late spathulatis extus sericeo-pubescentibus intus glabris 7 mm. longis 5 mm. latis, intimis angustatis 10 mm. longis 2 mm. latis. Amenta fl. ♀ cylindracea 6-7 cm. longa secus totam longitudinem dense florifera (vel præter partem inferiorem), rachis pubescentibus. Fl. ♀ 1-bracteati, floribus distinctis, sessilibus, bracteis ovatis apice rotundatis 2½ mm. longis utraque pagine pubescentibus; discus squamulæformis, squamulis antice 2-3-obscure lobulatis patentibus ⅓ mm. longis, postice erectis elobulatis. Stamina 5-6, filamentis distinctis 3-4 mm. longis filiformibus validiusculis, antheris late globosis ½ mm. longis utrinque emarginatis. Rudimentum ovarii O. Fl. ♀: 1-bracteati, brevissime pedicellati, pedicellis ½ mm. longis. Capsula longe ovata 2-valvis dehiscens basi leviter gibbosa 2½ mm. lata 7 mm. longa. Semina obovoidea 3 mm. longa, 1 mm. lata, testa tenuissima hyalina, pilis comæ 7 mm. longis albis.

Hab. Banchoryō, leg. S. Kusano, 1909.

Near *S. tetrasperma* Roxb., but differs from it by the ovate leaves which are abruptly acute at the apex and cordately rounded at the base.

Salix Mesnyi Hance in "Journ. Bot. (1882), p. 38"; Forbes et Hemsl. Ind. Fl. Sin. II. p. 530.

Hab. Formosa, Richard, Oldham.

Distrib. Kiangsu, Chekiang, Kiangsi, Hupeh, Yunnan, and Kwangtung.

I have seen the specimens at Kew. It is not yet represented at Tōkyō.

Gymnospermeæ.

Coniferæ.

Juniperus Linn.

Juniperus morrisonicola Hayata in Gard. Chron. (1908), p. 194 et Journ. Linn. Soc. XXXVIII. p. 298; Hayata Fl. Mont. Formos. p. 211.

This appears very like a specimen of *Juniperus recurva*, preserved at Kew. Further study will prove that they are identical.

Podocarpus L'Hért.

Podocarpus neriifolia D. Don ; DC. Prodr. XVI.-2, p. 514 ; Hook. f. Fl. Brit. Ind. V. p. 649 ; Forbes et Hemsl. Ind. Fl. Sin. II. p. 548.

Hab. Nantō : Suikoku, leg. T. Kawakami et U. Mori, 1906, Aug. (No. 1175).

Distrib. China : Szechuen. India, and Malaya.

Pinus Linn.

Pinus taiwanensis Hayata sp. nov. Ramuli fulvo-rubescentes, glabri sursum foliosi, pulvinis longe elevatis 3 mm. longis apice cupuliformibus. Alabastrum foliorum ovatum, perulis lanceolato-ovatis ∞-seriatis castaneis 6 mm. longis 1½ mm.–2 mm. latis acuminats margine ciliatis, ciliis tenuissimis longis complanatis. Folia geminata acerosa 9 cm. longa versus apicem ramulorum approximate erecta recta vel plus minus recurvata glabra dorso convexa facie profunde sulcata margine scaberula, vaginis membranaceis castaneis 12 mm. longis. Strobili conico-oblongi

5½ cm. longi 3½ cm. lati, squamis mediocribus angustatis 2½ cm. longis 8 mm. latis apice subrotundatis erectis, umbone impresso-elevato late rotundato vel late rhomboidali. Semina fulvo-albicantia oblique oblonga 5 mm. longa complanata apice obtusa basi acuta, alis cultriformibus 13 mm. longis 5½ mm. latis.

HAB. in Montibus Centralibus, leg. T. KAWAKAMI et U. MORI, 1906, Nov. (No. 2097); Randaizan, B. HAYATA et U. MORI, 1908, Aug. (No. 7142).

The present *Pinus* is very near *P. densiflora*, but differs from it in having more oblong ovate cone, with more elevated umbo; also near *P. yunnanensis* and *P. densata* MASTERS, but distinguishable from the former by the smaller cones and and two leaved shoots, and from the latter by the more slender leaves and not reflexed umbos; from *P. prominens* MASTERS, by the much longer cones with less edged apophysis. I have compared my plant with all the specimens of the genus in the Kew-Herbarium, but I have not been able to identify it. I think this may be a plant not yet described. In this, Dr. A. HENRY concurs.

Cycadaceæ.

Cycas LINN.

Cycas taiwaniana CARRUTHERS in Journ. Bot. (1893) p. 2, t. 331; FORBES et HEMSL. Ind. Fl. Sin. II. p. 560; MATSUM. et HAYATA Enum. Pl. Formos. p. 404.

HAB. China.

I have seen the species in the Herbarium at Hongkong, labelled "Kwang-tung, Lo-fare-shan". This is very near *C. revoluta* THUNB., but differs from it mainly in the female flowers. So far, we have never seen the plant in Formosa.

Monocotyledones.

Hydrocharideæ.

Halophila. Thou.

Halophila ovalis Hook. f.; Ostenfeld, in Philip. Journ. Sci. IV. Suppl. p. 67.

Hab. Pratas, Jan. 1908, leg. T. Kawakami.

Distrib.

This quite differs from *Halophila ovata* Gaudich., though they are sometimes confounded on account of their bearing very similar names. *H. ovata* exists in Japan.

Orchideæ.

Oberonia Lindl.

Oberonia formosana Hayata sp. nov. Herba epiphytica, cæspitosa, caulibus simplicibus vel rarius pauciramosis 3-5 cm. longis toto longitudine foliatis. Folia disticha sessilia alterna approximata verticaliter compressa lineari-lanceolata 22 mm. longa $2\frac{1}{2}$ mm. lata apice aristato-acuta margine integra basi latere inferiore recta superiore rotundata vaginosa caulem amplectantia crassiuscula. Spicæ terminales cum pedunculis 8 cm. longæ cernuæ, floribus minutis 1 mm. in diametro, secus rachin interrupte fasciculatim dense sitis, bracteis ovato-acuminatis 1 mm. longis reflexo-patentibus. Sepala lateralia late ovata basi connata $\frac{1}{2}$ mm. longa totiusque lata obtuso-acuta patentissima posticum minus. Petala sepalo angustiora oblonga $\frac{2}{3}$ mm. longa $\frac{1}{3}$ mm. lata obtusa. Labellum sessile concavum rotundatum in circumscriptione $\frac{2}{3}$ mm. longum totiusque latum 3-lobatum, lobo medio

majore apice tenuiter 3-lobulato obtuso, lobis lateralibus acutis brevioribus, basi minute callosum, callis rubris. Columna brevissima $\frac{1}{3}$ mm. longa.

HAB. Nantō : Randaizan. leg. T. KAWAKAMI et U. MORI, Juni. 1907, (No. 3474).

Somewhat near *O. japonica* MAXIM., but differs from it in having long lanceolate leaves which are as three times long as those of the japanese plant ; still nearer *O. Clarkei* in its habit and leaves, but differs from it by the lips with acute side-lobes which in *O. Clarkei* are fimbriate.

Oberonia insularis HAYATA sp. nov. Herba epiphytica, rhizoma repens squamatum, caulibus brevibus 1-2 cm. longis 5-6-foliatis. Folia secus caulem distichum disposita approximata alterna basi brevissime vaginata, cum vaginis oblique articulata, laminis lanceolato-ovatis $1\frac{1}{2}$ cm. longis 4 mm. latis apice acutis crassiusculis verticaliter compressis. Spicæ terminales cum pedunculis 5 cm. longæ cernuæ, bracteis lanceolatis $1\frac{1}{2}$ mm. longis margine serrulatis. Flores ignoti. Capsula breve pedicellata obovoidea $2\frac{1}{2}$ mm. longa apice truncata.

HAB. Nōkōzan, leg. T. KAWAKAMI et U. MORI, Jan. 1907, (No. 6278).

Very near *O. japonica* in the shape of the leaves and in its habit, but the fruits are different.

Liparis RICH.

Liparis Nakaharai HAYATA sp. nov. Caulis 2-foliatus, inferne brevissime vaginatus, vaginis ovatis brevioribus superne gradatim elongatis. Falia 2, ad basin caulis sita, oblanceolata, cum petiolis 35 cm. longa 2 cm. lata, racemum in longitudine æquantia, apice acuminata basi gradatim attenuata in petiolum 10 cm. longum abeuntia

ima basi articulata multinervia utrinque glabra. Flores mediocres 2 cm. in diametro, in racemum laxe-floratum 15 cm. longum terminalem pedunculatum dispositi, pedunculis 18 cm. longis gracilibus erectis, bracteis lanceolatis 1 cm. longis. Sepala libera patentia linearia 9 mm. longa 1 mm. lata apice obtusa, posticum postice reflexum recurvatum, latralia antice paralleliter patentia inferne recurvata. Petala linearia 9 mm. longa ½ mm. lata postice et inferne reflexa. Labellum cuneiforme in circumscriptione 8 mm. longum, 5½ mm. latum a medio antice curvatum apice latissime truncatum irregulariter denticulatum basi columnæ affixum, a medio basi erectum ima columnam amplectans a medio superne patens elobatum basi 2-tuberculatum. Columna elongata 5 mm. longa semiteres.

Hab. Taitō, Manchōsha, leg. T. Kawakami et G. Nakahara, Jan. 1906, (No. 766).

This is very distinct species; it is somewhat near *L. flaccida* in its habit, but very much different from it in having much larger lips, longer pedicels and in many other points.

Liparis nervosa Lindl.; Gen. Sp. Orch. p. 26; Benth. Fl. Hongk. p. 352; Franch. et Savat. Enum. Pl. Jap. II. p. 21; Forbes et Hemsl. Ind. Fl. Sin. III. p. 7; Matsum. et Hayata Enum. Pl. Formos. p. 406.

Liparis formosana Reichb. f.

Hab. Nantō: Randaizan, leg. T. Kawakami et U. Mori, Juli. 1907, (No. 3355).

Distrib. Japan, Loo-choo islands, Hongkong.

Liparis taiwaniana Hayata sp. nov. Caulis brevissimus in pseudobulbum incrassatus 2-foliatus, vaginis brevioribus 5-6 instructus. Folia oblanceolata, 18 cm. longa 17 mm. lata apice

acuminata basi attenuata ima basi articulata 3-costata. Racemi ad apicem caulium laterales cum pedunculis 20 cm. longi folio æquilongi, partibus floriferis 8 cm. longis laxifloratis, bracteis lanceolatis 7 mm. longis, floribus mediocribus 1 cm. in diametro. Sepala æqualia patentissima, exteriore valde reflexa recurva oblongo-linearia 1 cm. longa $1\frac{3}{4}$ mm. lata apice obtusa. Petala angusto-linearia 1 cm. longa $\frac{1}{2}$ mm. lata sursum margine convoluta teretia apice obtusa postice reflexa. Labellum ad basin columnæ, basi erectum a medio sursum patens, ima basi auriculatum, obovatum in circumscriptione 8 mm. longum, apice dilatatum 7 mm. latum versus basin angustatum, basi $2\frac{1}{2}$ mm. latum, margine latere integrum, apice inæqualiter denticulatum, lobis lateralibus obscuris, supra basin 2-tuberculatum. Columna 6 mm. longa semiteres 2-alata apice incurvata.

Hab. Nantō : Randaizan, leg. T. Kawakami et U. Mori, Jan. 1908, (No. 6309).

This is near *L. plicata* and *L. Uchiyamæ*, but distinguishable from them by the longer and more slender column of the flowers. The columns of the other species are very much shorter ; also very near *Liparis viridiflora* L., but differs from it in having larger flowers and in the lips with obscure lobes.

Dendrobium Sw.

Dendrobium flaviflorum Hayata sp. nov. Caulibus 40-50 cm. longis teretibus gracilibus, internodiis 3 cm. longis 4 mm. latis vix flexuosis suberectis toto longitudine foliatis, vaginis foliorum persistentibus. Folia alterna disticha angusta $9\frac{1}{2}$ cm. longa 9 mm. lata apice obtusa oblique emarginata basi angustata crassiuscula cum vaginis articulata, vaginis brevibus 5 mm. longis totiusque latis, ore oblongo. Racemi pauciflorati laterales graciles basi

incrassati, vaginis imbricatis inferne brevissimis superne gradatim longioribus 2½ cm. longis 7 mm. latis instructi, sursum bracteati, bracteis angustis 23 mm. longis 8 mm. latis apice acutis basi angustis pedicellum amplectantibus, floribus pedicellatis, pedicellis gracilibus divaricatis 1¼ cm. longis. Flores flavi majusculi circ. 2½ cm. in diametro. Sepala subæqualia patentia, posticum liberum oblongum 22 mm. longum 8 mm. latum apice apiculato-acutis basi angustatis, lateralia basi obliqua pedi columnæ adnata, mentum gibbosum 4 mm. longum formantia, superne libera, sepalo postico æquilonga. Petala oblongo-obovata, 23 mm. longa, 12 mm. lata apice obtusa basi attenuata contracta. Labellum late rotundatum unguiculatum, unguis angustatus 6 mm. longus 3 mm. latus basi ad pedem columnæ adnatus, in pedem incumbens, lamina late rotundata 18 mm. longa 23 mm lata obscure 3-lobata vel clobata apice rotundata basi late truncato-rotundata margine eroso-denticulata minute undulata superne dense breveque villosa medio concava basi leviter callosa inferne glabra. Columna 4 mm. longa 3 mm. lata apice 2-dentata, pede 4 mm. longo.

Hab. Formosa, VII. 1907.

Precise habitat of this specimen is not given. I remember having seen the plant on Mt. Manapan, when I was botanizing on the same mountain.

Dendrobium Goldschmidtianum Kränzl. in Engl. Pfl.-reich. IV. 50, II. B. 21, p. 116.

Dendrobium Linawianum Reichb. f. in Walp. Ann. VI. p. 284; Forbes et Hemsl. Ind. Fl. Sin. III. p. 12. Caulibus 6-7-foliatis 30 cm. longis complanatis, (internodiis superioribus 3 cm. longis clavato-incrassatis apice clavatis 12 mm. latis complanatis basi attenuatis, internodiis inferioribus teretibus subcomplanatis angustioribus 3 mm.

longis globoso-incrassatis brevissimis), caulibus ad nodos flexuosis, superiore foliatis inferiore vaginatis, caulibus annotinis vaginis persistentibus instructis. Folia plana oblonga 7 cm. longa 24 mm. lata apice oblique emarginata supra nitida subtus pallidiuscula crassiuscula integra, petiolis vaginæformibus internodia amplectantibus tubiformibus 15 cm. longis 6 mm. lata. Racemi breves 2-3-florati laterales infra vaginam foliorum deciduorum siti. Flores majusculi 5 cm. in diametro, pedicellis cum ovario 5-6 cm. longis. Sepala subæquilonga, posticum liberum, lateralia oblongo-angustata, 29 mm. longa 9 mm. lata apice breve acuta basi obliqua pedi columnæ adnata, mentum longe calcariforme 1 cm. longum formantia, superne libera. Petala sepalo postico æquilonga latioraque oblonga 29 mm. longa 17 mm. lata apice obtusa basi contracta. Labellum unguiculatum oblongum cum ungue 27 mm. longum 16 mm. latum, unguis angustatus 7 mm. longus 4 mm. latus ad apicem pedis columnæ adnatus in pedem incumbens, lamina late oblonga 2 cm. longa 17 mm. lata apice rotundato-obtusa basi apicem columnæ amplectans supra medium dense breve hirsuta expansa. Columna breviuscula, 5 mm. longa 3 mm. lata apice minute 2-brachiata basi in pedem longiusculum 1 cm. longum producta. Rostellum truncatum. Anthera terminalis opercularis incumbens cucullata 2-locularis. Pollinia 4 cerea oblonga 1½ mm. longa obtusa a latere compressa per paria in loculis collateralia.

Hab. Formosa, leg. T. Uchiyama, 1899.

Distrib. It is recorded from China, but the precise habitat of the species remains as yet unknown.

Dendrobium Nakaharai Schlecht.; Hayata in Tōkyō Bot. Mag. XX. p. 76.

Distrib. An endemic plant.

Dendrobium randaiense Hayata sp. nov. Caulis longus ramosus superne validus inferne gracilis, (internodiis brevibus 1 cm. longis), sursum foliatus. Folia alterna disticha oblonga 4 cm. longa 5 mm. lata apice acuta basi angustiora cum vaginis articulata, vaginis 1 cm. longis 5 mm. latis. Flores longiusculi, 3 cm. longi solitarii pedicellati, pedicellis 1 cm. longis. Sepala valde inæqualia suberecta, posticum liberum oblongum 17 mm. longum 5 mm. latum apice acutum basi leviter connatum, lateralia majuscula latioraque sepalo postico æquilonga basi obliqua pedi columnæ connata, mentum calcariforme 2 cm. longum formantia. Petala sepalo postico minora oblique oblonga 15 mm. longa $4\frac{1}{2}$ mm. lata apice acuta basi angustiora. Labellum angustatum unguiculatum cum ungue 3 cm. longum erectum basi pedi columnæ connatum, (parte connata 6 mm. longa), sursum unguis 2 cm. longus medio latere margine uno dente retrorso instructus basi laminæ breve 2-lamellatus, lamina ovata 1 cm. longa 5 mm. lata apice obtusa basi rotundata gradatium in unguem abeuns. Columna brevissima 1 mm. longa basi in pedem 2 cm. longum producta.

Hab. Nantō: Randaizan, leg. T. Kawakami et U. Mori, Juli. 1907.

Dendrobium equitans Kränzl. in Engl. Pfl.-reich IV. 50, II. B. 21, p. 228.

Observ. Caulis elongatus compressiusculus gracilis 30-40 cm. longus, (internodiis superioribus sub-teretibus complanatis 3 cm. longis 4 mm. latis, inferioribus bulboso-incrassatis 3 cm. longis 6 mm. latis), vaginis foliorum persistentibus. Folia disticha, sub-acerosa, tereto-linearia, recta vel curvata 7 cm. longa 2 mm. lata verticaliter compressa apice acuta crassiuscula cum vaginis articulata. Racemi

in uniflorem reducti, floribus albis mediocribus 2 cm. longis subterminalibus 1-bracteatis, bracteis membranaceis vaginiformibus 4 mm. longis, ore 2-3-fidis. Sepala subæqualia erecta, posticum oblongum, 12 cm. longum 4½ cm. latum apice obtusissimum basi non contractum subconnatum, lateralia basi oblonga pedi columnæ adnata mentum 8 mm. longum calcariforme formantia superne libera. Petala sepalo postico æquilonga angustiora oblongo-obovata 10 mm. longa 4 mm. lata apice obtuso-acuta. Labellum obovatum 18 mm. longum 11 mm. latum apice rotundatum basi cuneatum trilobatum ad apicem pedis columnæ adnatum in pedem incumbens, lobis lateralibus deorsum integris apice denticulatis, lobo medio rotundato-fimbriato 5 mm. longo, inter lobos laterales cristato-hirsutum. Columna brevissima 2 mm. longa, totiusque lata apice minute 2-brachiata basi in pedem 8 mm. longum producta ; rostellum truncatum. Anthera terminalis opercularis cucullata 2-locularis. Pollinia 4 cerea oblonga 1 mm. longa obtusa a latere compressa per paria in loculis collateralia. Capsula oblongo-obovoidea apice contracto-angustata truncata basi attenuata 2 cm. longa 8 mm. lata erecta vel leviter nutans pedicellata, pedicellis 5 mm. longis.

Hab. Formosa, leg. T. Uchiyama, 1898.

Dendrobium tenuicaule Hayata sp. nov. Caulis tenuis gracilis, 40-50 cm. longus, 1½ mm. in diametro, internodiis 1½-2 cm. longis vaginis foliorum persistentibus. Folia linearia 6 cm. longa 2½ mm. lata apice acuta basi angustata cum vaginis articulata, vaginis internodiis æquilongis ore oblique obtusis. Flores laterales solitarii minores 1½ cm. longi, pedicellis 6 mm. longis. Sepala subæqualia, posticum liberum oblongum 12 mm. longum 4 mm. latum apice obtusum basi angustatum, lateralia basi pedi columnæ connata,

mentum calcariforme 4 mm. longum formantia superne libera. Petala sepalo postico æquilonga. Labellum rhombeum a medio sursum abrupte acutum basi attenuatum unguiculatum 14 mm. longum 7 mm. latum obscure 3-lobatum vel elobatum supra medio hirsutum margine apice laceroso-ciliolatum. Columna brevissima ½ mm.–1 mm. longa basi pedem 5 mm. longum producta.

Hab. Shōkwa, leg. T. Kawakami et Y. Shimada, Juli.

Bulbophyllum Thou.

Bulbophyllum (*Cirrhopetalum*) **racemosum** Hayata sp. nov. Herba, caule seu rhizomate repente radicante, pseudobulbis acuminato-ovatis 2½ cm. longis 8 mm. latis apice longe attenuatis 1-foliatis. Folia cum pseudobulbis articulata subsessilia oblongo-lanceolata 12 cm. longa 13 mm. lata apice obtusa minute aristata basi attenuata in petiolum abeuntia crassiuscula supra plana, venis indistinctis, subtus pallidissima venosa utraque glabra. Scapi floriferi a latere pseudobulborum aphylli, vaginis 3-4 instructi 12 cm. longi graciles, vaginis tenuibus 1 cm. longis. Flores laxe spicati, bracteis lanceolatis 9 mm. longis. Sepalum posticum brevius liberum ovato-lanceolatum 5 mm. longum 1½ mm. latum acuminatum basi leviter contractum valde concavum, lateralia multo longiora angusto-acuminata 7½ mm. longa basi parce dilatata 2 mm. lata apice longe caudata columnæ pedi adnata, paralleliter ascendentia. Petala sepalis multo breviora ovata 2⅓ mm. longa 1½ mm. lata eleganter ciliato-serrata. Labellum basi valde contractum cum pede columnæ mobiliter articulatum in pedem incumbens sursum recurvum elongatum 2½ mm. longum 1½ mm. latum integrum ad basin laminæ utrinque late auriculatum. Discus 2-calloso-lamellatus. Columna recta brevis 2 mm. longa basi in

pedem 2 mm. longum antice arcuatum producta superne 2-alata, alis utrinque in brachium erectum productis, brachiis aristatis ½ mm. longis ; clinandrium postice truncatum et in dentem brevem productum antice (rostellum) rotundatum.

Hab. Nantō : Shojōdaizan, leg. T. Kawakami et U. Mori, Aug. 1906, (No. 1239).

In referring this plant to the genus *Bulbophyllum*, I am following Mr. R. A. Rolfe who has adviced me that the genus *Cirrhopetalum* merges so imperceptibly into *Bulbophyllum* that the two are now regarded as indistinguishable.

Chrysoglossum Blume.

Chrysoglossum formosanum Hayata sp. nov. Rhizoma repens, caulibus brevibus leviter incrassatis 1-foliatis. Folia petiolata 25 cm. longa oblonga 6½ cm. lata utrinque acuta basi in petiolum attenuata plicato-venosa utrinque glabra, petiolis gracilibus 20 cm. longis. Scapi aphylli basi vaginati 50 cm. longi validiusculi, racemis laxifloratis 15 cm. longis, pedicellis 1 cm. longis, bracteis ovato-lanceolatis 1½ cm. longis scariosis. Flores mediocres 1 cm. longi, pedicellis (cum ovario) 1 cm. longis. Sepala subæquilonga, erecto-incurvata, lanceolato-angustata, 13 mm. longa 3 mm. lata apice obtusa basi non contracta 3-nervia, posticum liberum, lateralia basi paullo latiora, cum pede columnæ in mentum breve saccatum connata, saccis 1 mm. longis. Petala sepalo postico subsimilia. Labellum basi cum pede columnæ continuum erectuum, cruciforme cum ungue 8 mm. longum 7 mm. latum, unguis 2 mm. longus alatus, alis crispatis ; lamina explanata 3-lobata, lobo medio rotundato 3 mm. lato margine incurvo, lobis lateralibus transverse divaricatis oblongis 3 mm. longis obtusis ; discus 3-lamellatus, lamellis 1 mm. latis undulatis. Columna erecta leviter arcuata semiteres 6 mm.

longa medio 2-cornuta deorsum 2-alata basi in pedem brevem producta ima basi 2-auriculata, auriculis minutis. Clinandrium postice prominens, antice (rostellum) 2-lobatum, lobis albo-marginatis. Anthera terminalis, opercularis, incumbens, late obtriangularis antice truncato-mucronata discrete 2-locularis, ultra loculos breviter producta; pollinia 2 cerea in quoque loculo solitaria, collateralia angulato-globosa inappendiculata libera.

Hab. Nantō: Tokunkei, leg. T. Kawakami et U. Mori, Juli. 1907, (No. 3490).

Near *C. erraticum*, but differs from it in the shape of the claws of the lips.

Collabium Blume.

Collabium formosanum Hayata sp. nov. Herba terrestris rhizomate longe repente, internodiis 4 cm. longis. Folia secus rhizomata solitaria ovata 10 cm. longa 4-5 cm. lata apice acuta basi abrupte contracta ad petiolum attenuata cum petiolis articulata plicato-venosa, petiolis 2 cm. longis incrassatis basi vagina longa scariosa inclusis. Scapi e rhizomate erecti elati 25 cm. longi graciles simplices aphylli basi vaginati, racemis 5 cm. longis laxe floratis. Flores majusculi 2 cm. longi breve pedicellati secus rhachin laxe dispositi, bracteis membranaceis angustis 5 mm. longis. Sepala subæquilonga, posticum liberum spathulato-lineare 17 mm. longum $2\frac{1}{2}$ mm. latum apice acutum, lateralia basi cum pede columnæ in mentum 5 mm. longum $1\frac{1}{2}$ mm. latum calcariforme connata, calcari 5 mm. longo. Petala sepalo postico similia. Labellum obovato-attenuatum 16 mm. longum basi unguiculatum in pedem columnæ incumbens superne erectum, unguis sursum gradatim dilatatus ad laminam abeuns, lamina obovata 7 mm. lata apice minute serrulata profunde 3-lobata, lobis

lateralibus cum lobo medio convergentibus oblique oblongis 4 mm. longis 3 mm. latis, lobo medio lato apice rotundato 5 mm. longo patente margine lacero-serrulato. Columna erecta 1 cm. longa 1 mm. lata semiteres, basi in pedem 5 mm. longum rectum producta; clinandrium erectum obliquam postice in dentem productum, antice (rostellum) truncatum. Anthera late rotundata 1 mm. longa terminalis, opercularis incumbens, ultra pollinia producta, distincte 2-locularis; pollinia 2 cerea in quoque loculo solitaria globoso-angulata.

Hab. Nantō: Randaizan, leg. T. Kawakami et U. Mori, Juli. 1907, (No. 3181).

Eria Lindl.

Eria Corneri Reichb. f. in Gard. Chron. (1878), II. p. 106; Forbes et Hemsl. Ind. Fl. Sin. III. p. 16; Matsum. et Hayata Enum. Pl. Formos. p. 409.

Hab. Nantō: Batsushaho, leg. T. Kawakami et U. Mori, Aug. 1906, (No. a).

Distrib. Kwangtung.

Observ. Caulis brevis in pseudobulbos incrassatus, bulbis ovoideis 4 cm. longis 1½ cm. latis apice 2-foliatis basi 2-3-vaginis suffultis. Folia oblongo-lanceolata cum petiolis 23 cm. longa, 4 cm. lata, apice acuminata, basi angustata in petiolum attenuata. Scapi prope apicem pseudobulborum laterales, erecti, racemis 5 cm. longis, floribus mediocribus 8 mm. in diametro. Sepala valde inæqualia, posticum liberum oblongo-angustatum 7 mm. longum 1½ mm. latum, lateralia latiora falcata 3 mm. lata basi valde obliqua pedi columnæ connata mentum 3 mm. longum calcariforme latius formantia. Petala linearia falcata 7 mm. longa 1⅓ mm. lata apice obtuso-rotundata. Labellum 6½ mm. longum basi con-

tractum cum pede columnæ articulatum in pedem incumbens a medio sursum reflexum patens 3-lobatum, lobis lateralibus erectis rotundatis semioblongis, lobo medio triangulari acuto 2½ mm. lato; discus ab apicem labelli usque ad basin 3-lamellatus, lamellis sursum crispis. Columna 2 mm. longa basi in pedem 4 mm. longum producta.

Pachystoma Blume.

Pachystoma chinense Reichb. f. Benth. Fl. Hongk. p. 356; Forbes et Hemsl. Ind. Fl. Sin. III. p. 17; Matsum. et Hayata Enum. Pl. Formos. p. 409. Herba terrestris, caulibus simplicibus cum racemis 40 cm. longis gracilibus erectis aphyllis toto longitudine membranaceo-vaginatis, vaginis 3 cm. longis apice acutis superioribus acuminatis. Racemi simplices 10 cm. longi, floribus mediocribus 12 mm. longis (præter ovarium) in alabastro erectis post anthesin cernuis vel pendulis, ovariis et pedicellis brevissime villosis, pedicellis ½ cm. longis, bracteis angustis membranaceis fere hyalinis 1 cm. longis 3 mm. latis acuminatis. Sepala æquilonga extus hirsuta intus glabra erecta conniventia, posticum oblongum 1 cm. longum 3½ mm. latum apice acutum, lateralia basi obliqua pedi columnæ brevissimo adnata. Petala sepalo postico æquilonga angustiora oblanceolata 9½ mm. longa 1½ mm. lata apice obtusa. Labellum pedi columnæ affixum eique basi adnatum nunc erectum ovatum in circumscriptione 9 mm. longum 6 mm. latum 3-lobatum, lobo medio 3 mm. longo 2 mm. lato, lobis lateralibus brevibus oblongis erectis; discus medio laminæ carnosulo-lamellatus, lamellis hirtellis cristis minutis instructis. Columna erecta longiuscula 6 mm. longa arcuata subteres basi in pedem brevissimum producta superne clavato-dilata.

Hab. Nantō : Shashizan, leg. T. Kawakami et U. Mori, Mart. 1908, (No. 3735).

Distrib. Kwangtung, Hongkong.

The present plant is a little different from the Chinese in the shape of lips. In our plant, two lateral nerves of the middle lobe of the lip are strongly crested which unite together at the apex, while the central nerve is very thin and not crested. In the Chinese plant, the middle lobe of the lip has 3-5 nerves which are equally crested.

Spathoglottis Blume.

Spathoglottis plicata Blume "Bijdr. p. 401, t. 76."

Hab. Kōtōshō, leg. T. Kawakami et U. Mori, 1907, (No. 2451).

Distrib. Malaya.

Phajus Lour.

Phajus gracilis Hayata sp. nov. Caules 40-50 cm. longi, racemis a basi caulium emergentibus. Folia elongata plicata in petiolum longum contracta, laminis obovato-oblongis 20 cm. longis 6½ cm. latis apice obtuse acuminatis basi distincte contractis, petiolis 2-3 cm. longis basi vaginatis, vaginis 8 cm. longis striatis. Racemi cum pedunculis 30 cm. longis erecti graciles, partibus floriferis 8 cm. longis laxifloratis, bracteis oblongo-lanceolatis 1½ cm. longis, floribus majusculis 3½ cm. longis (præter ovarium). Sepala libera patentia, posticum angustatum 3½ cm. longum 1 cm. latum utrinque obtusum, lateralia postico breviora oblonga 3 cm. longa 1 cm. lata apice plicato-acuta basi obliqua latere inferiore obscure auriculata. Petala sepalo postico

angustiora spathulata, 3 cm. longa 6 mm. lata apice obtusa basi attenuata. Labellum erectum cucullatum 28 mm. longum 25 mm. latum (expanso) basi in calcar rectum 1 cm. longum productum 3-lobatum, lobis lateralibus amplis erectis columnam involventibus apice undulatis, lobo medio expanso latiore 1½ cm. lato 8 mm. longo patente margine undulato apice emarginato-2-lobulato, prope sinus lamellato-tuberculato, lamellis medio incrassatis hirsutis cæterum glabris. Columna longiuscula 2 cm. longa 2-alata apice clavata, alis latioribus.

Hab. Kōshūn: Botansha, leg. G. Nakahara, DC. 1906, (No. 788).

Near *P. philippinensis* N. E. Brown, but differs from it by the much longer spurs and the oblong blades of leaves; from *P. tetragonus* Reichb. f. and *P. luridus* Thw., by the larger flowers with much longer spurs; from *P. maculatus* Lindl. by the smaller flowers with longer slender spurs. The present plant is nearest *P. mishmensis* Reichb. f., but differs from it in having smaller flowers with narrower lips.

Bletia R. et Pav.

Bletia formosana Hayata sp. nov. Herba 30-40 cm. alta, caulibus e rhizomate repente erectis ima basi leviter incrassatis, basi foliosis a medio sursum aphyllis. Folia plana angusta sessilia cum vagina articulata, laminis linearibus apice acuminatis 20-30 cm. longis 1 cm. latis membranaceis 3-costatis utrinque glabris costis subtus prominentibus, vaginis 5-7 cm. longis cum laminis oblique articulatis. Flores majusculi 1-2 cm. longi, in racemum terminalem laxum simplicem dispositi, racemis 10 cm. longis, bracteis conspicuis ovarium in longitudine æquantibus, ante anthesin distichum imbri-

catis lanceolatis scariosis 1½ cm. longis alabastrum florum amplectantibus. Sepala subæqualia libera recto-patentia lanceolata multinervia acuta 16 mm. longa 4 mm. lata. Petala sepalis similia. Labellum ad basin columnæ erectum oblongum sepalis æquilongum 16 mm. longum 7 mm. latum apice emarginato-mucronatum obscure 3-lobatum, lobis lateralibus columnam amplectantibus integris, medio latiore patente margine undulato a basi usque ad prope apicem 5-lamellato-striato, lamellis cristatis. Columna longiuscula 12 mm. longa, cum alis 4 mm. longis suberecta, leviter arcuata, complanata utrinque anguste alata, (alis 1½ mm. latis); pes 0. Capsula oblongo-linearia basi attenuata apice truncata.

Clinandrii lobus posterior rotundatus, dentifer, 1 mm. longus, utrinque latere 1-nervius, anterior (rostellum) rotundatus 1 mm. longus 2 mm. latus integer. Anthera terminalis orbicularis 1½ mm. in diametro opercularis incumbens discrete 2-locularis, connectivo lato apice 2-lobato; pollinia 8, non satis nota.

Hab. Giran, leg. T. Kawakami et U. Mori, Juni. 1906, (No. 1335); Nantō: Mandaikei, leg. T. Kawakami et U. Mori, Jan. 1908, (No. 6277).

Near *Bletia hyacinthina* R. Br., but differs from it by the much smaller-flowers and by the leaves spreading from the base of the stem.

Bletia morrisonicola Hayata sp. nov. Herba erecta tenuis, caulibus 20 cm. longis gracilibus, pseudobulbis globosis 8 mm. latis. Folia pauca elongata linearia 20 cm. longa 7 mm. lata apice acuminata plicata basi attenuata, in petiolum contracta, vaginis 3-4 cm. longis cum laminis obscure articulatis. Racemus terminalis 6 cm. longus, (bracteis parvis scariosis 8 mm. longis ante anthesin imbricatis), laxe floratus simplex. Flores fere sessiles. Sepala libera erecta-patentia subæqualia angustata 15 mm. longa 4 mm. lata apice acuta basi angustiora. Petala sepalo postico æquilonga

sed angustiora 3 mm. lata. Labellum basi columnæ suberectum basi contractum oblongum 11 mm. longum 5 mm. latum 3-lobatum, lobis lateralibus semioblongis parallelis integris angustatis columnam non amplectantibus; medio latiore 4½ mm. lato 2½ mm. longo emarginato; discus lamellis 5 denticulato-crispis instructus. Columna elongata semiteres leviter arcuata, utrinque alata, 11 mm. longa cum alis 2½ mm. lata, alis 1 mm. latis; pes 0.

Clinandrium lobo posteriore late rotundato emarginato, lobis lateralibus minutis, lobo anteriore (rostello) horizontaliter patente-incurvato late rotundato; anthera denti postico clinandrii affixa, opercularis incumbens, distincte 2-locularis, loculis imperfecte 2-locellatis; pollinia 8, in quoque loculo 4.

Hab. in monte Morrison, ad 10000 ped. alt., leg. T. Kawakami et U. Mori, Nov. 1906, (No. 2311).

Bletia kotœnsis Hayata sp. nov. Caulibus 50 cm. longis erectis ima basi leviter incrassatis, basi foliosis, a basi sursum aphyllis. Folia plana angusta sessilia cum vagina articulata, laminis lanceolatis 30 cm. longis 3-4 cm. latis utrinque 3-4-costatis costis subtus prominentibus, utraque pagine glabris apice acuminatis basi angustatis, in vaginam attenuatis, vaginis 6 cm. longis ore obliquis cum laminis oblique articulatis. Flores majusculi 1-2 cm. longi, in racemum terminalem 20 cm. longum pauce ramosum laxe dispositi, bracteis conspicuis ovarium in longitudine æquantibus, ante anthesin arcte imbricatis, lanceolato-oblongis scariosis 1½ cm. longis ½ cm. latis, alabastrum florum amplectantibus. Sepala subæqualia libera recto-patentia lanceolata 22 mm. longa 5 mm. lata multinervia acuta. Petala sepalis similia. Labellum ad basin columnæ erectum oblongum sepalis brevius, 16 mm. longum 8 mm. latum apice rotundatum brevissime acutum 3-lobatum, lobis lateralibus columnam subamplectantibus margine integris obtusis, medio latiore 5 mm. longo totiusque lato, margine

profunde undulato, a prope apicem usque ad basin medio 5-lamellato-striato, lamellis undulatis cristatis 1 mm. atis circ. 13 mm. longis. Columna longiuscula 12 mm. longa cum alis 3½ mm. lata, semiteres, utrinque alata, (alis 1½ mm. latis) ; pes 0.

Clinandrium lobo posteriore late rotundato 1½ mm. longo 2 mm. lato apice tenuiter 2-lobato obscure denticulato vel subintegro ; lobo anteriore (rostello) rotundato lato horizontaliter recurvo. Anthera terminalis orbicularis 1 mm. in diametro opercularis incumbens discrete 2-locularis, connectivo lato apice emarginato. Pollinia 8, non satis nota.

HAB. Kōtōshō, leg. T. KAWAKAMI et U. MORI, Aprili. 1907, (No. 2452).

Pleione DON.

Pleione formosana HAYATA sp. nov. Caulis 25 cm. longus inferne vaginatus. Folia oblanceolata 15 cm. longa 2.5 cm. lata apice acuta basi attenuata in vaginam obeuntia plicata 5-costata utrinque glabra inter costas 5-vena, venis parallelis, inferiore vaginis aphyllis superiore gradatim foliatis, vaginis tubiformibus, 5-10 cm. longis circ. 10-nerviis, nervis sursum anastomosantibus. Racemi 2-3 vel pauci-florati, floribus majusculis circ. 5 cm. longis breve pedicellatis, bracteis angustis 4 cm. longis. Sepala æqualia spathulata 5 cm. longa 11 mm. lata apice rotundato-acuta basi angustata 7-nervia. Petala sepalis subsimilia sed plus minus longiora et angustata 5½ cm. longa 7 mm. lata. Labellum basi columnæ affixum subpatens late ovatum 5 cm. longum 42 mm. latum sursum rotundatum deorsum acutum apice emarginatum 2-lobulatum basi contractum columnam subamplectans, margine a medio deorsum integerrimum sursum fimbriatum ; discus 4-lamellatus, 2-lamellis centralibus 4 cm. longis 1½ mm. latis, 2-lateralibus brevioribus 3 cm. longis 1 mm. latis dentiformibus,

undulatis. Columna elongata apice leviter arcuata 3 cm. longa 4 mm. lata complanata apice latere alata.

Clinandrium latissimum 8 mm. latum, lobo posteriore obscure 3-lobato, anteriore (rostello) latiore rotundato 4 mm. lato, 3½ mm. longo horizontaliter patente. Anthera a denti postico clinandrii affixa, incumbens. Pollinia non satis nota.

Hab. Nanō: Hyahōsha, Igiris, ad 6000 ped. alt., leg. U. Mori, Aprili. 1909, (No. 16).

Near *Pleione pogonioides* Kränzl. = *Cœlogyne pogonioides* Rolfe.

Calanthe R. Br.

Calanthe arisanensis Hayata sp. nov. Caulibus 2-3-foliatis, in pseudobulbos incrassatis, pseudobulbis 1 cm. longis. Folia pauca lanceolata 30 cm. longa 4 cm. lata acuminata basi gradatim attenuata ad petiolum vaginatum abeuntia plicato-venosa glabra inferiore vaginis aphyllis 5 mm. longis. Scapi e rhizomate erecti, 50 cm. longi. Racemi simplices, laxe pauceque florati, bracteis lanceolatis 1 cm. longis. Sepala subæqualia libera patentia, posticum acuminato-ovatum 22 mm. longum 9 mm. latum apice acuminatum, (acuminibus filiformibus 2-3 mm. longis), basi rotundatum contractum, lateralibus longioribus 25 mm. longis. Petala sepalis subsimilia ovato-lanceolata 18 mm. longa 5 mm. lata apice acuminata basi angustata. Labelli unguis cum columna in tubum cylindraceum 5 mm. longum connatus, ima basi in calcar 10 mm. longum leviter incurvum productus; lamina patens, late rotundata basi truncata 13 mm. longa 20 mm. lata profunde 3-loba, sinibus inter lobos rotundatis, lobo medio rotundato basi angustato contracto 8 mm. longo 10 mm. lato emarginato ad sinus aristato, (aristis 2 mm. longis), margine undulato, lobis lateralibus auriculiformibus 1 cm. longis 5 mm. latis margine undulatis latere

inferiore truncatis. Discus supra laminam 3-calloso-lamellatus, lamellis cristatis. Columna brevis erecta 8 mm. longa apoda intus pilis retrorsis hirsuta, alis usque ad apicem extensis cum ungue labelli connatis. Clinandrium membranaceum, profunde excavatum.

HAB. Arizan, leg. U. MORI, Mart. 1908, (No. 3609).

Calanthe brevicolumna HAYATA sp. nov. Caulis brevis incrassatus 1-2-foliatus. Folia sessilia oblanceolata 35 cm. longa 8 cm. lata apice acuta basi attenuata. Scapi aphylli vel 1-foliati vel vaginati, 70 cm. longi validiusculi, racemis densifloratis 10 cm. longis, bracteis ovatis 2 cm. longis 6 mm. latis. Flores mediocrini 2 cm. in diametro, pedicellis 5 mm. longis. Sepala æqualia erecto-patentia, ovata 9 mm. longa 6 mm. lata apice obtusa basi contracta. Petala sepalis angustiora oblongo-angustata 1 cm. longa 3 mm. lata apice truncata basi angustata. Labellum sepalis longius, (unguis cum alis columnæ in tubum connatus tubo late campanulato 3 mm. in diametro), ima basi in calcar 6 mm. longum 1½ mm. latum productum, calcari subrecto ; lamina patens obovata in circumscriptione, 8 mm. longa 5 mm. lata 3-lobata, lobo medio longiore 6 mm. longo apice divaricato-2-lobulato, (lobulis oblongo-truncatis), basi cuneato, lobis lateralibus minoribus oblique oblongis antice falcatis apice obtusis 3 mm. longis 1½ mm. latis ; discus calloso-cristatus basi labelli 3-seriatim dispositus. Columna brevis 3 mm. longa. Clinandrium excavatum ; rostellum 2-lobatum, lobis oblongis obtusis ; anthera rotundata antice breve acuta. Pollinia 8 elongato-ovata apice acuminata, caudiculis brevissims.

HAB. Taitō : Bataian, leg. T. KAWAKAMI, Aprili. 1907.

Near *C. herbacea* LINDL., but differs from it in having much shorter spurs, and in the lips, sepals, and in many other points.

Calanthe elliptica Hayata sp. nov. Caulibus brevibus in pseudo-bulbum late globosum 5 mm. longum incrassatis unifoliatis. Folia oblonga 18 cm. longa 6½ cm. lata apice breve acuta basi abrupte angustata ad petiolum vaginatum 9 cm. longum abeuntia utrinque glabra plicato-plana. Scapi 30-40 cm. longi basi 3-4-vaginis instructi, vaginis apice foliaceis circ. 10 cm. longis, racemis laxifloratis, bracteis lanceolatis minutis 4 mm. longis. Flores majusculi 2 cm. in diametro æquantes. Sepala æqualia libera oblonga 15 mm. longa 6 mm. lata apice acuminata basi contracta. Petala oblongo-lanceolata 12 mm longa 4 mm. lata basi angustata truncata extus hirtellata. Labelli unguis basi columnæ alis in tubum late campanulatum connatus, ima basi gradatim angustatus in calcar 17 mm. longum productus; lamina elobata late rotundata 7 mm. longa 1 cm. lata margine crispata apice emarginato-mucronata; tubus et calcar extus hirtellati intus pilosi; discus calloso-lamellatus, lamellis 1 mm. latis 4-5 mm. longis incrassatis.

Clinandrium profunde excavatum, cavea intus hirsuta 5 mm. profunda, lobo posteriore oblique truncato, anteriore (rostello) erecto 2-lobato, lobis acutis dentiformibus. Pollinia non satis nota.

Hab. Shintiku: Gakōkei, leg. T. Kawakami et K. Watanabe, Aprili. 1908.

The flowers of the present plant are very near *C. arisanensis*; but distinguishable by its leaves.

Calanthe graciliflora Hayata sp. nov. Folia 2-3 oblongo-spathulata cum vaginis 30 cm. longa 6½ cm. lata apice acuminata basi gradatim attenuata ad vaginam abeuntia utrinque glabra plicato-plana. Scapi graciles 60 cm. longi, racemis laxifloratis, floribus mediocribus 3½ cm. in diametro, bracteis lanceolatis scariosis 1 cm. longis tenuibus, pedicellis gracilibus 1 cm. longis,

petalis et sepalis valde postice reflexis, labello antice horizontaliter patente. Sepala subæqualia oblongo-lanceolata 2 cm. longa 6 mm. lata apice aristato-acuminata basi leviter contracta 5-nervia, extus breve hirtellata. Petala sepalis angustiora oblanceolata apice acuta basi attenuata 18 mm. longa 4 mm. lata 3-nervia. Labellum antice patens, unguis cum alis columnæ in tubum connatus, tubo angusto (ore 2 mm. in diametro intus hirtellato) ima basi attenuato in calcar 12 mm. longum 1 mm. latum producto, calcari extus et intus hirtellato; lamina rotundata in ambitu, 1 cm. longa totiusque lata 3-lobata, lobo medio angusto 5 mm. longo 2 mm. lato apice emarginato-aristato, aristis 1 mm. longis desuper reflexis lobis lateralibus quadrangulari-rotundatis 4 mm. longis totiusque latis oblique divaricatis ; discus calloso-lamellatus, lamellis 3. Columna brevis 5 mm. longa clavata.

Clinandrium excavatum, lobo posteriore truncato, anteriore (rostello) 2-lobato, lobis dentiformibus. Anthera opercularis incumbens, postice cordata antice acuminata 3 mm. longa distincte 2-loculata, loculis distincte 2-locellatis. Pollinia 8 subcomplanata elongato-ovata apice attenuata 1½ mm. longa caudiculis connata, caudiculis 1 mm. longis.

HAB. Nanō, Kimmonsha, ad 3200 ped. alt., Aprili. 1909, (No. 15), leg. U. MORI.

Near *C. Henryi* ROLFE., but differs from it by the much narrower leaves and by the lips with very much divaricate side-lobes which are inserted at nearly 90°. In the other species they are inserted at an acute angle and nearly as long as the middle lobe.

Calanthe Kawakamii HAYATA sp. nov. Caulis brevis in pseudobulbum late globosum 1 cm. longum incrassatus basi vaginatus supra basin foliatus. Folia oblonga 20 cm. longa 9 cm. lata apice breve acuta basi abrupte ad vaginam contracta plicato-plana. Scapi 40-50 cm. longi graciles basi foliati vel aphylli vaginati,

racemis laxe floratis, floribus breve pedicellatis, bracteis lanceolatis 1 cm. longis. Flores majusculi, 3½ cm. longi, pedicellis 5 mm. longis. Sepala inæqualia extus brevissime hirtellata, posticum majus ovato-oblongum 33 mm. longum 15 mm. latum apice breve cuspidato-acutum basi contractum, lateralia angustiora oblongo-lanceolata 3 cm. longa 1 cm. lata apice obtuse acuminata basi angustata. Labelli unguis alis columnæ in tubum campanulatum (ore 5 mm. in diametro) connatus, ima basi in calcar 7 mm. longum rectum productus, lamina patens 2 cm. longa totiusque lata profunde 3-lobata, lobo medio obovato-oblongo 13 mm. longo 9 mm. lato apice emarginato ad sinus breve aristato basi angustato, lobis lateralibus divaricatis cultriformibus 1½ cm. longis 8 mm. latis apice rotundatis; discus 4-lamellatus, lamellis supra medium laminarum sitis, 2-lateralibus a medio deorsum intus dense pilosis. Columna lata brevis 8 mm. longa, alis cum ungue labelli connatis.

Clinandrium profunde excavatum oblique truncatum, lobo anteriore (rostello) oblique erecto 2-lobato, lobis dentiformibus; anthera ad apicem membranarum posteriorum clinandrii affixa incumbens cordato-ovata apice obtuse acuminata 7 mm. longa 4 mm. lata 2-locularis. Pollinia 8, in quoque loculo 4, cerea oblonga plus minus complanata apice attenuata basi rotundata circ. 2⅔ mm. longa apice caudiculis connata, caudiculis filiformibus 2½ mm. longis.

Hab. Shintiku: Gakokeizan, leg. T. Kawakami et K. Watanabe, Aprili. 1907.

Calanthe okinawensis Hayata sp. nov. Caulis ? Folia pauca ovato-lanceolata cum petiolis 30 cm. longa 6½ cm. lata apice acuminata basi gradatim attenuata ad petiolum vaginiformem abeuntia plicato-venosa glabra vel parcissime hirsuta. Scapi circ. 70 cm. longi graciles aphylli tenuiter pubescentes, (pilis brevissimis patentibus), inferiore remotissime squamati, (squamis obtuso-ovatis amplexicaulibus tenuibus glabris 1 cm. longis),

superiore villosi racemosi. Racemi laxe florati 5-6 cm. longi, floribus longe pedicellatis bracteatis, bracteis ovatis hirsutis acutis 1 cm. vel ½ cm. longis, pedicellis (cum ovariis) 3 cm. longis, floribus apertientibus 3½ cm. in diametro. Sepala æquilonga oblongo-obovata 2 cm. longa 8 mm. lata apice cuspidato-acuminata basi leviter angustiora, iis lateralibus angustioribus. Petala sepalis plus minus breviora obovata 16 mm. longa 8 mm. lata apice rotundato-apiculata basi cuneato-acuta. Labelli unguis alis columnæ connatus, basi in tubum campanulatum (ore 2½ mm. in diametro) ima basi in calcar filiforme 2 cm. longum 1 mm. latum rectum vel leviter recurvatum productus; lamina patens 12 mm. longa 13 mm. lata 3-lobata, lobo medio majusculo elongato-flabelliformi apice 13 mm. lato basi 3 mm. lato margine eroso-denticulato apice 2-lobulato, lobulis latere interiore imbricatis 2 mm. longis, rotundatis, lobis lateralibus minimis angustatis 6 mm. longis, 2 mm. latis apice obtuso-truncatis. Discus callosus 3-lamellatus ad basin laminarum situs, lamellis 2-3 mm. longis 1 mm. latis. Columna lata brevissima 3 mm. longa. Ovarium angusto-cylindricum 1¼ mm. in diametro, sulcatum hirsutum basin ad pedicellum abeuns, cum pedicellis 3 cm. longum.

Hab. Okinawa, leg. Y. Tashiro, 1887, Mart. (No. 18); Tanegashima, leg. S. Tanaka, 1891, Sept.

This plant is very near *C. japonica*, but differs from it in having obovate petals and much smaller bracts.

Eulophia R. Br.

Europhia ramosa Hayata sp. nov. Caulis circ. 50 cm. longus, glaber angulatus striatus basi squamatus, (squamis amplexicaulibus ovatis acutis 15 mm. longis), superiore racemosus. Folia (Kawakami No. 6281) inferiora lanceolato-linearia 20 cm. longa 6 mm. lata

basi amplexicaulia ad vaginam attenuata, superiora minora, linearia 3-6 cm. longa amplexicaulia plicata. Racemi 20-25 cm. longi pauci-ramosi, ramis gracilibus erectis. Flores erecto-ascendentes 15 mm. longi, pedicellis cum ovario 15 mm. longis, bracteis ovatis acuminatis pedicellum amplectantibus 7 mm. longis. Sepala æquiformia lanceolato-angustata 12 mm. longa 2½ mm. lata, apice acuta, basi leviter angustata erecta. Petala sepalis latiora plus minus breviora 11 mm. longa 3½ mm. lata lanceolato-obovata apice acuta erecta. Labellum a basi columnæ erectum obovatum, sepalum in longitudine æquans, 11 mm. longum 8 mm. latum, inter sepala lateralia in calcar gibbosum 2 mm. longum ad apicem leviter contractum productum, supra basin contractum, 3-lobatum, lobis lateralibus erectis columnam amplectantibus latissimis margine latere integris antice eroso-denticulatis apice obtusis lobo centrali patente globoso-obovato 4 mm. longo 5 mm. lato apice rotundato-truncato basi leviter contracto ad basin 3 mm. lato. Discus medio a basi labellorum usque ad medium 3-lamellatum, lamellis utrinque ramosis, etiamque ad paginam lobi centralis a medio usque ad prope apicem fimbriato-cristatus. Columna brevis crassa apoda sæpius 2-alata. Ovarium cylindricum sulcatum 6 mm. longum.

Hab. Nōkōzan, leg. T. Kawakami et U. Mori, 1908, Jan. (No. 6281).

The present species is near *E. taiwanensis* Hayata, from which it differs in having branched inflorescence and smaller flowers with slightly denticulate lips.

Eulophia taiwanensis Hayata sp. nov. Caulis foliatus basi in pseudobulbos oblongos 2 cm. longos incrassatus. Folia linearia 50-60 cm. longa 5-6 mm. lata ad apicem caulis 2-4 disposita.

Scapi aphylli erecti 40 cm. longi ima basi vaginati, vaginis imbricatis 3 cm. longis apice obtusis ore fissis, inferiore squamati, squamis ovato-acuminatis 2-3 cm. longis 7-8 mm. latis amplexicaulibus, membranaceis, apice racemosi. Racemi simplices 5-6 cm. longi, (bracteis lanceolatis 1½ cm. longis acuminatis), laxiflorati. Flores suberecti circ. 1 cm. longi longe pedicellati, pedicellis cum ovario 1½ cm. longis gracillimis. Sepala æquiformia angustata 12 mm. longa 3 mm. lata apice acuto-obtusa basin æquilata. Petala sepalis minora angustata 11 mm. longa 2½ mm. lata apice acuta basi leviter contracta vel æquilata. Labellum a basi columnæ suberectum 1 cm. longum, basin inter sepala abrupte in calcar cylindricum 4 mm. longum rectum productum, 3-lobatum, lobis lateralibus subintegris latere exteriore 7 mm. longis, latere interiore 1 mm. longis apice obtusis labello circ. adnatis. lobo centrali patente obovato-globoso 5 mm. longo totiusque lato apice rotundato, margine alte-denticulato, dentibus ½ mm. longis obtusis patentibus. Discus a basi labellorum 3-lamellatus, lamellis integris, a medio labellorum cristatus, cristis 3-seriatim dispositis, a medio sursum fimbriato-cristatus, cristis 3-5-seriatim dispositis 1-1½ mm. longis. Columna 5 mm. longa. Ovarium cylindricum 5 mm. longum sulcatum.

Hab. Taitō : Takai, leg. T. Kawakami et G. Nakahara, Jan. 1906, (No. 684) ; Akō : leg. T. Kawakami et U. Mori, 1906, (No. 1087).

The present orchid greatly differs from *E. formosana* Rolfe. in having much smaller flowers with much narrower sepals and petals. It may perhaps be the same as a specimen at Kew, labelled "Henry, No. 560, China."

Cymbidium Sw.

Cymbidium formosanum Hayata sp. nov. Folia longissima linearia 30-40 cm. longa 8 mm. lata apice acuta basi longe attenuata coriacea 3-costata, costis subtus elevatis, venis utrinque elevatis. Scapi graciles 15 cm. longi ad basin caulis oriundi, simplices ad totam longitudinem vaginati, vaginis laxis alternis scapum amplectantibus, lanceolatis 6 cm. longis 5-7 mm. latis acuminatis. Flores ad apicem scapi solitarii majusculi 5 cm. in diametro breviter pedicellati, bracteis vaginis similibus sed minoribus. Sepala subæqualia libera patentia, posticum lanceolatum 4 cm. longum 7 mm. latum acutum basi non contractum sed leviter angustatum, lateralia angustiora 3½ cm. longa 5 mm. lata apice oblique breve acuta. Petala sepalis breviora latioraque oblonga 25 mm. longa 9 mm. lata apice acuta. Labellum ad basin columnæ sessile suberectum oblongum 19 mm. longum 6 mm. latum basi concavum 3-lobatum, lobis lateralibus latiusculis semi-oblongis 1 cm. longis 4 mm. latis apice obtusis erectis, columnam laxe amplectantibus, lobo medio patente recurvo indiviso longe rotundato 1 cm. longo 6½ mm. lato apice rotundato-mucronato, disco 2-lamellato, lamellis 1 cm. longis a basi usque ad apicem loborum lateralium. Columna longiuscula 12 mm. longa 3 mm. lata semiteres arcuata anguste alata apoda. Anthera terminalis opercularis incumbens late semiglobosa 1-locularis antice truncato-emarginata.

Hab. Akō: Raisha, leg. G. Nakahara, ad 3000 ped. alt., Jan. 1907.

Near *C. Leachianum* Reichb. f., but differs from it in having longer sheath-like bracts. Also near a specimen at Kew labelled "Henry No. 1352."

Sarcochilus R. Br.

Sarcochilus formosanus Hayata sp. nov. Herba epiphytica, caulibus foliatis abbreviatis 1 cm. longis. Folia carnosa alterna disticha approximata lanceolata 4 cm. longa 7 mm. lata apice acuta leviter falcata basi tortuosa cum vaginis articulata decidua. Pedunculi laterales 5 cm. longi erecti graciles apice 3-5-florati medio 1-bracteati, floribus sessilibus, bracteis minutis 2 mm. longis. Flores parvi. Sepala patentia libera, posticum oblongum 8 mm. longum 3 mm. latum apice obtusum, lateralia obovata 7 mm. longa 5 mm. lata apice obtusa basi valde obliqua pedi columnæ adnata. Petala sepalo postico subsimilia oblongo-angustata 6 mm. longa 2 mm. lata apice obtusa. Labellum pedi columnæ affixum basi saccatum, (sacco latiusculo 5 mm. longo totiusque lato basi 2-lobulato obtuso), 3-lobatum, lobis lateralibus erectis petaloideis rotundatis 4 mm. latis, lobo medio circ. obsoleto vel minimo inter lobos laterales crassiusculo dense hirsuto, prope apicem medio lamellato-appendiculato. Columna erecta $1\frac{1}{2}$ mm. longa.

Hab. Formosa, leg. T. Kawakami et U. Mori.

Near *S. pugionifolius* Hook. f., but differs from it by the 3-lobed-lips. Very like *Sarcochilus sp.* from Manila at Kew, but the flowers look like different. Somewhat near *Dendrocolla alba* Ridl. in its habit, but differs by the obtuse sepals and petals which are nearly equal in length.

Saccolabium Blume.

Saccolabium formosanum Hayata sp. nov. Herba epiphytica, caulibus foliatis non pseudo-bulbosis prostratis, vaginis foliorum

persistentibus instructis ad nodos radicantibus. Folia disticha patentia carnosa plana oblonga 2 cm. longa 7 mm. lata apice obtusa breve apiculata basi in petiolum 2 mm. longum cum vaginis articulatum deciduum contracta, vaginis 5 mm. longis persistentibus caulem obtegentibus. Racemi laterales breves 3 cm. longi pauciflorati, bracteis minutis squamosis, pedicellis 1 cm. longis, floribus mediocribus 13 mm. in diametro. Sepala æqualia libera patentia oblonga 5 mm. longa 3 mm. lata, apice utrinque obtusa concava. Petala patentia sepalo subsimilia, apice rotundata margine exteriore recurvata. Labellum ad basin columnæ sessile basi saccatum, saccis majusculis 6 mm. longis totiusque latis, ore contracto 4 mm. in diametro, lamina patente latissima 4 mm. longa 1 cm. lata apice truncata latere divaricata obtusa. Discus ad medium laminæ incrassatus hirsutus. Columna brevis $1\frac{1}{2}$ mm. longa 3 mm. lata, rostellum 2-dentatum, dentibus desuper recurvis.

Hab. Arizan, in monte Morrison, leg. T. Kawakami et U. Mori, Mart. 1908, (No. 3164).

Somewhat near *S. japonicum* but differs from it in having flowers with longer peduncles. There is none like this at Kew.

Saccolabium pumilum Hayata in Tōkyō Bot. Mag. XX. p. 76.

Sarcanthus Lindl.

Sarcanthus taiwanianus Hayata sp. nov. Herba epiphytica, caulibus erectis validis teretibus foliatis non pseudo-bulbosis 25 cm. longis, vaginis persistentibus caulem obtegentibus. Folia disticha carnosa plana late lincaria 30 cm. longa 4 cm. lata apice oblique emarginata sessilia cum vaginis articulata, vaginis

persistentibus 5 cm. longis. Paniculæ laterales quasi-axillares validiusculæ recurvæ ramosæ, ramis 5-6 divaricatis validiusculis 4 cm. longis, bracteis minutis squamosis triangularibus. Flores parvi 1 cm. in diametro breve pedicellati flavo-viridescentes intus purpurascentes, pedicellis 2-3 mm. longis transverse divaricatis. Sepala libera æqualia patentia carnosula obovato-oblonga 5 mm. longa $3\frac{1}{2}$ mm. lata apice obtusa. Petala sepalo angustiora 4 mm. longa $1\frac{2}{3}$ mm. lata apice rotundata postice reflexa. Labellum basi columnæ affixum continuum patens basi calcaratum, (calcari breve cylindraceo 3 mm. longo $1\frac{1}{2}$ mm. lato, ore antice lamina longitudinali semidiviso, ad os postice latereque calloso-appendiculato), 3-lobatum, lobis lateralibus ad latus calcaris brevis auriculiformibus, lobo medio latiusculo 3 mm. longo 5 mm. lato semiorbiculari apice rotundato margine denticulato medio late calloso-ruguloso patente. Columna breve oblonga subteres 2 mm. longa. Clinandrium truncatum.

HAB. Formosa, leg. T. UCHIYAMA, 1899.

Near *S. formosanus* ROLFE, from which the present plant is distinguishable by the labellum which is trilobed, two lateral lobes being very small, and the terminal one very large, broad, and denticulate on the margin. In *S. formosanus* R., the middle lobe of the lip is again trilobed, while in this new species the middle lobe is not lobed, but minutely denticulate. The present genus is separated from *Saccolabium* (which has no plate in the spur), by the longitudinal plate dividing the mouth of the spur; also from *Cleisostoma* which has a transversal plate covering the mouth of the spur.

Cleisostoma BLUME.

Cleisostoma breviracema HAYATA sp. nov. Herba epiphytica,

caulibus 30-40 cm. longis, flexuosis gracilibus foliatis non pseudobulbosis, (internodiis 17 mm. longis complanatis 4 mm. latis), vaginis foliorum deciduorum obtectis. Folia disticha sessilia angusto-lanceolata 8 cm. longa 13 mm. lata apice acuminata basi contracta cum vaginis articulata, (costis supra impressis sulcatis subtus indistinctis), patentia carnosa plana, vaginis persistentibus caulem obtegentibus 1½ cm. longis internodiis æquilongis ore oblongis. Racemi sessiles laterales oppositifolii 5-6-florati floribus transverse divaricatis, bracteis triangularibus incrassatis 2 mm. longis. Flores patentes 14 mm. in diametro omnes crassiusculi. Sepala valde patentia inæqualia libera, posticum angustius oblongo-spathulatum 9 mm. longum 3¼ mm. latum apice obtusum basi non contractum, lateralibus latioribus oblique obtusis 7½ mm. longis 4¼ mm. latis apice obtusis basi leviter contractis latere inferiore truncatis. Petala sepalo postico similia sed angustiora spathulata 8 mm. longa 3 mm. lata apice obtusa basi attenuata. Labellum basi columnæ affixum basi in saccum 4 mm. longum 2½ mm. latum ore angustum hirtellum intus longitudinaliter indivisum sed ore squama postica integra subclausum productum, (squama erecta angustata 2 mm. longa ⅔ mm. lata, antice incurva apice truncata postice recurva sub rostello extensa incrassata margine ciliata), 3-lobatum, lobis lateralibus ad latus oris saccæ adnatis minutis obtuse dentiformibus 2 mm. longis, lobo medio erecto late rotundato brevi 2½ mm. longo 3½ mm. lato emarginato brevissime obtuso-mucronato medio leviter excavato. Columna brevis lata 2½ mm. longa totiusque lata exalata basi in pedem brevem producta; clinandrium breve truncatum latere leviter 2-dentatum; lobo anteriore (rostello) desuper recurva 1 mm. longo apice 2-lobato; anthera terminalis opercularis incumbens, antice attenuata, supra pollinia producta; pollinia 4 per

paria conferta cerea inappendiculata, stipite angusto 1¼ mm. longo ½ mm. lato hyalino ; glandula squamiformis rotundata.

HAB. Formosa, leg. T. UCHIYAMA, 1899.

The genus to which the present species is referred, is separated from *Sarcanthus* by the transversal plate covering the mouth of the spur, and also from *Echioglossum*, by the nearly round glandule. In the latter genus, the glandules are horse-shoe-shaped and the mouth of the spur is narrowed by a thickening of the tissue, which characters, however, do not very distinctly separate the genus from *Cleisostoma*.

Appendicula BLUME.

Appendicula formosana HAYATA sp. nov. Herba epiphytica, caulibus secus rhizoma sæpius confertis multi-foliatis teretibus 25 cm. longis 3 mm. in sectione, vaginis foliorum persistentibus. Folia alterna disticha approximata oblonga 2½ cm. longa 7 mm. lata apice rotundata 2-dentata ad sinus dentium aristata basi tortuosa vix contracta cum vaginis articulata, vaginis 5 mm. longis imbricatis, ore obliquis. Racemi pseudo-axillares breves 5-10 mm. longi 5-10 florati basi dense bracteati recurvati, bracteis oblongo-triangularibus acutis minutis 2 mm. longis, floribus minoribus 3 mm. longis. Sepala subæqualia, posticum liberum oblongo-triangulare 2½ mm. longum 1½ mm. latum apice obtusum, lateralia latiora basi pedi columnæ adnata, mentum calcariforme 1½ mm. longum antice productum formantia superne libera. Petala sepalo postico angustiora oblonga 2 mm. longa ⅘ mm. lata apice obtusa. Labellum ad apicem pedis columnæ basi contractum articulatum incumbens medio reflexum superne patens apice rotundatum 1⅔ mm. latum integrum ; discus liguliformis callosus a medio

deorsum pendulus. Columna brevis 1 mm. longa totiusque lata. Pollinia 8 oblonga apice attenuata.

Hab. Formosa, leg. T. Uchiyama, 1896.

Appears to be near *Podochilus reflexus* Schlecht., *P. Vieillardii* Schlecht., and *P. micranthus* Schlecht., but differs from them by the flowers.

Appendicula kotœnsis Hayata sp. nov. Caulis 20 cm. longus 3 mm. in diametro. Folia alterna disticha oblonga 2 cm. longa 9 mm. lata apice oblique emarginata cum vaginis articulata, vaginis 1 cm. longis imbricatis, ore obliquis. Racemi laterales prope apicem caulium siti, $1\frac{1}{2}$ cm. longi, floribus 10-15 minoribus, 2 mm. in diametro, bracteis minutis 2 mm. longis. Sepala inæqualia, posticum liberum sed basi brevissime cum iis lateralibus connatum oblongo-triangulare 1 mm. longum 1 mm. latum apice obtusum basi dilatum, lateralia latiora æquilonga basi pedi columnæ adnata mentum breve latius $\frac{2}{3}$ mm. longum formantia, superne libera. Petala sepalo postico æquilonga angustiora 2 mm. longa $\frac{2}{3}$ mm. lata apice obtusa basi angustata. Labellum ad apicem pedis columnæ basi contractum articulatum gibbosum incumbens a medio sursum patens valde reflexum basi auriculatum intus 2-foveolatum medio contractum sursum expans rotundatum apice obtusum margine irregulariter denticulatum vel subintegrum; discus prope basin labelli situs collosus minor. Columna brevissima $\frac{1}{4}$ mm. longa basi in pedem $\frac{1}{2}$ mm. longum producta. Pollinia 8 oblonga apice attenuata.

Hab. Kōtōshō, leg. T. Kawakami et U. Mori, Aug. 1906, (No. 5802).

Vanilla Sw.

Vanilla Griffithii Reichb. f. ? R. A. Rolfe Rev. Gen. Vanilla, in Journ. Linn. Soc. XXXII. p. 458.

Hab. Tōyen : Sōkaku, leg. T. Kawakami et U. Mori, 1907, Mart. (No. 2799).

There is at Kew a specimen exactly the same as this, which specimen is mentioned in the paper above cited, with the following note : "A specimen collected at Bankingsing in the island of Formosa, (leg. Dr. A. Henry, No. 479), has the inflorescence and bracts remarkably like *V. Griffithii*."

Anœctochilus Blume.

Anœctochilus Roxburghii Lindl. Gen. et Sp. Orch. p. 449 ; Forbes et Hemsl. Ind. Fl. Sin. III. p. 42 ; Matsum. et Hayata Enum. Pl. Formos. p. 415.

Hab. Shintiku : Goshizan, leg. T. Kawakami, 1905, Dec. (No. 1307).

Distrib. South China, and Tropical Himalaya.

Goodyera R. Br.

Goodyera albo-reticulata Hayata sp nov. Caulis erectus 15 cm. longus gracilis inferiore foliatus. Folia alterna petiolata ovata 4½ cm. longa 2 cm. lata apice acuta basi rotundata ad petiolum contracta supra eleganter albo-reticulata, petiolis 1½ cm. longis a medio ad basin dilatatis caulem amplectantibus. Flores in spicis laxis dispositi, spicis 5 cm. longis, bracteis lanceolato-ovatis 7 mm. longis 2 mm. latis acuminatis. Sepala petalaque ignota. Capsula sessilis, ovato-oblonga 9 mm. longa 3 mm. lata.

Hab. Taitō : Botansha, leg. T. Kawakami et G. Nakahara, Jan. 1906.

Near *G. Matsumurana* Schlecht., but distinguishable by the narrower and longer fruit and much smaller flowers.

Goodyera morrisonicola Hayata sp. nov. Caulis basi inferne radicans superne ascendens 10 cm. longus, tota longitudine foliatus. Folia alterna petiolata ovata vel ovato-oblonga 3 cm. longa 1½ cm. lata apice acuta basi rotundata margine minute crispata 3-5-nervia, petiolis 1½ cm. longis a medio deorsum dilatatis caulem amplectantibus. Scapi terminales 4 cm. longi laxe florati pubescentes, bracteis lanceolatis acuminatis 1 cm. longis basi 4 mm. latis florem subamplectantibus. Sepala subæqualia libera, posticum erectum concavum oblongo-angustatum 1 cm. longum 3½ mm. latum apice obtusum cum petalis angustis in galeam connivens, lateralia libera erecta. Petala oblonga 11 mm. longa 3 mm. lata, apice obtusa basi attenuata. Labellum ad basin columnæ sessile plicato incurvo-ascendens 8 mm. in longitudine basi subsaccatum, (saccis intus villosis apice recurvo-obtusis), margine integrum, apice dentibus lateralibus brevibus. Columna brevis 1 mm. longa apice longe 2-cornuta, cornibus 3½ mm. longis. Anthera erecta ovato-lanceolata 3½ mm. longa apice attenuata acuminata. Capsula recta oblonga erostrata 1 cm. longa 4 mm. lata.

Hab. in monte Morrison, ad 6500 ped. alt., leg. T. Kawakami et U. Mori, Oct. 1906, (No. 2323).

Near *G. Henryi* Rolfe., but the leaves of the present plant are narrower, acuter, and the bracts are more acuminate.

Goodyera nantœnsis Hayata sp. nov. Caulis basi repens, erectus 15 cm. longus foliatus superne et inferne squamatus.

Folia petiolata ovata 2 cm. longa 13 mm. lata apice obtusa basi rotundata in petiolum contracta, petiolis lamina folii longioribus 1½ cm. longis basi dilatatis caulem amplectantibus ; squamis caulium lanceolatis 1½ cm. longis superiore gradatim brevioribus. Flores minores secus racemum secundatim dispositi, racemis 4 cm. longis dense floratis, bracteis ovato-lanceolatis acuminatis 5 mm. longis. Sepala æqualia libera, posticum ovato-oblongum 2 mm. longum obtusum cum petalis angustioribus connivens, lateralia postico vix longiora æquiformia. Labellum 2½ mm. longum basi ventricosum intus minute tuberculatum. Columna brevissima ⅓ mm. longa.

Hab. Tōyen : Yuhonsha, leg. T. Kawakami et U. Mori, Mart. 1907, (No. 5932) ; Horisha, Hinokiyama, leg. G. Nakahara, Feb. 1907.

Near *G. repens* R. Br. but differs from it by the much smaller flowers. Also near *G. Schlechtendaliana* Reichb. f., but distinguishable from it by the very much smaller flowers and denser inflorescence.

Goodyera procera Hook.; Lindl. Gen. et Sp. Orch. p. 493 ; Forbes et Hemsl. Ind. Fl. Sin. III. p. 45 ; Matsum. et Hayata Enum. Fl. Formos. p. 417.

Hab. Nagodake leg. G. Nakahara. 1907, April.

Aphyllorchis Blume.

Aphyllorchis tanegashimensis Hayata sp. nov. Scapi aphylli circ. 60 cm. longi basi squamati, squamis amplexicaulibus late ovatis apice rotundato-obtusis subglabris 13 mm. longis 8 mm. latis, superiore squamis remotis lincaribus 2 cm. longis 1½ mm.

latis (bractea conformibus) instructi, sursum tortuosi racemosi. Racemi 20 cm. longi remote florati, floribus primum erecto-ascendentibus demum pendulis. Sepala subæqualia libera erecta, posticum apice leviter incurvo-angustatum 12 mm. longum 3½ mm. latum, lateralia plus minus angustiora apice obtusa 3-nervia. Petala sepalo angustiora æquilonga extus carinata 1-nervia margine valde revoluta tenuissima. Labellum ad basin columnæ sessile basi erectum a medio sursum patens, unguis brevis 2 mm. longus latere 2-auriculatis, auriculis transverse divaricatis 3 mm. longis oblique triangulari-cuspidatis; lamina ovata 7 mm. longa 5 mm. lata obscure 3-lobata, lobo medio triangulari obtuso, lobis lateralibus obscuris latere rotundatis. Columna longiuscula 11 mm. longa 1 mm. lata subteretis complanata.

Hab. Tanegashima, leg. S. Tanaka, 1891, Sept. (No. 442).

The genus is new to the flora of the archipelago.

Pogonia Juss.

Pogonia Nervilia Blume.

Hab. Kōshūn, leg. T. Kawakami, 1906, Juli. (No. 5159).

In the imperfectness of the specimen, the determination is rather conjectural.

Pogonia (*Nervilia*) **purprea** Hayata sp. nov. Herba terrestris, caulis foliatus brevissimus bulbosus, scapis floriferis aphyllis vaginatis. Folia cordata 5 cm. longa 6 cm. lata apice rotundata brevissime apiculata basi cordata ad sinus acuta margine integra supra breve setulosa subtus glabra, petiolis 2½ cm. longis. Scapi aphylli inferiore vaginati, (vaginis 3 cm. longis apice rotundatis summum brevissime apiculatis), sursum 2-3 florati, bracteis oblanceo-

latis 1½ cm. longis 2 mm. latis. Sepala æqualia libera erecta spathulata 15 mm. longa 3 mm. lata apice breve acuta basi attenuata. Petala sepalis angustiora lineari-oblanceolata 14 mm. longa 2½ mm. lata apice breve acuta basi attenuata erecta. Labellum basi columnæ rectum liberum erectum obovatum obscure 3-lobatum 12 mm. longum 10 cm. latum apice rotundatum. Columna elongata 7 mm. longa, apice clavata erecta.

Hab, Kōshūn : leg. T. Kawakami, Juli. 1906, (No. 5150).

Near *Pogonia plicata* Lindl., but differs from it by the broader oblanceolate sepals and much narrower linear bracts.

Pogonia (*Nervilia*) **taitœnsis** Hayata sp. nov. Caulibus bulboso-incrassatis. Scapi aphylli inferiore vaginati 13 mm. longi gracillimi apice racemose 2-3-florati, bracteis linearibus 1 cm. longis, floribus purpureis 15 mm. longis. Sepala erecta linearia libera, posticum 15 mm. longum 1½ mm. latum, lateralia postico angustiora 18 mm. longa 1 mm. lata. Petala sepalo postico æqualia 1¼ mm. lata apice acuta. Labellum erectum obovatum 18 mm. longum 10 mm. latum apice acutum basi attenuatum supra hirsutum tenuiter 3-lobatum, lobo medio majusculo margine denticulato oblongo-triangulari, lobis lateralibus brevibus oblique triangularibus acutis margine integris. Columna 7 mm. longa.

Hab. Taitō, Rinō, leg. T. Kawakami.

Didymoplexis Griff.

Didymoplexis pallens Griff. ; Forbes et Hemsl. Ind. Fl. Sin. III. p. 47 ; Matsum. et Hayata Enum. Pl. Formos. p. 418.

Herba tenuis aphylla. Scapi simplices 10-15 cm. longi ut videntur volubili, racemis 3 cm. longis paucifloratis vel ad florem unicum reductis, bracteis triangularibus 1½ mm. longis, floribus 7 mm. longis non satis notis.

Hab. Tainan, leg. T. Kawakami et S. Ishida, Mai. 1909.

Gastrodia R. Br.

Gastrodia Stapfii Hayata sp. nov. Tuber non visum. Scapus plus minus recurvatus 20-30 cm. longus glaber inferiore remote vaginatus, vaginis 6 mm. longis apice 2-3-lobatis, medio remote squamatus, squamis obtuso-ovatis 3 mm. longis, superiore florifer racemosus. Racemi 5 cm. longi remote florati, bracteis glabris obtuso-ovatis 3 mm. longis semi-amplexicaulibus, pedicellis 2 mm. longis. Sepala petalo conformia cum petalis in tubum ventricosum 9 mm. longum 6 mm. latum apice 5-lobum antice alte fissum connata, tubo 5-nervio, nervis ad apicem loborum attingentibus, lobis sepaloidalibus triangularibus obtuso-acutis, lobis petaloidalibus rotundatis emarginatis apiculatis 1½ mm. longis, sinibus inter lobos rotundatis. Labellum pedi columnæ affixum sepalis æquilongum dorso perianthio breviter adnatum 9 mm. longum 5 mm. latum, lamina erecta late ovata obtusa indivisa integra 3-nervia, nervis ad apicem convergentibus, versus apicem callosa 5 mm. longa totiusque lata basi subito angustata in stipitem 4 mm. longum 1⅔ mm. latum abeunte, stipite margine sursum glanduloso-calloso. Columna elongata 6 mm. longa 3 mm. lata complanata apice 3-lobata, lobis lateralibus angustissimis 1 mm. longis ½ mm. latis. Capsulæ obconico-obovoideæ apice truncatæ basi attenuatæ 4 mm. longæ 3 mm. latæ primum erectæ demum pendulæ.

Hab. Yæyama, leg. S. Tanaka, 1891, Juni.

Near *Gastrodia gracilis* Blume. The present plant is named in honour of Dr. O. Stapf, to whom I am greatly indebted for his constant kindness during my work at Kew.

Galera Blume.

Galera Rolfei Hayata sp. nov. Tuber solitarium 3 cm. longum 12 mm. latum elongato-ellipticum apice obtusum carnosum horizontaliter situm. Scapus circ. 35 cm. longus incrassatus erectus rectus basi ascendens teres brunneus inferne squamis distantibus amplexicaulibus obtusis tenuissimis membranaceis instructus, superne florifer, bracteis alternis erecto-patentibus lineari-lanceolatis acuminatis membranaceis circ. 1 cm. longis uni-florem amplectantibus. Flores in pedicellis filiformibus cernui aut tandem penduli scapo concolores. Sepala æquiformia angustata erecta 7 mm. longa 1 mm. lata obtuso-acuminata integra parcissime punctata, lateralibus plus minus obliquis. Petala sepalo latiora 7 mm. longa 2 mm. lata acuminata. Labellum sessile concavum gynostemium amplectans, ima in calcar breve obtusum 3 mm. longum rectum productum, limbo ovato obtuso 9 mm. longo erecto ad margines subintegro vel sub lente minutissime eroso intus papilloso infra apicem parcissime papilloso. Gynostemium brevissimum crassum obtusissimum 2 mm. longum dorso rotundato-convexum. Ovarium obovoideum sulcatum, pedicello 4 mm. longo.

Hab. Okinawa, leg. S. Tanaka, 1891, Mai. (No. 147).

The present plant is near *G. nutans*, but differs from it in having shorter spurs, and in the lips which are obtuse at the apex, nearly entire on the margin, and very much less papillose on the upper surface. It is named in honour of Mr. R. A. Rolfe

who has helped me in determining orchidaceous plants in my collections.

Herminium Linn.

Herminium angustifolium Benth.; Matsum. et Hayata Enum. Pl. Formos. p. 418.

Observ. Caulis 30-40 cm. longus erectus glaber inferiore foliatus. Folia lanceolata 13 cm. longa 14 mm. lata apice acuminata arcuata basi angustata caulem amplectantia; squamis a medio caulium sitis, bracteæformibus lanceolatis acuminatis 2 cm. longis. Spicæ dense floratæ 2 cm. longæ, bracteis ovato-lanceolatis 1 cm. longis, floribus minoribus 5 mm. latis. Sepala subæqualia 1-nervia suberecta ovato-oblonga $2\frac{1}{2}$ mm. longa $1\frac{1}{2}$ mm. lata apice obtusa. Petala angustiora $2\frac{1}{2}$ mm. longa $\frac{2}{3}$ mm. lata. Labellum ad columnam continuum antice patens angustum profunde 3-lobatum, parte indiviso basilari 3 mm. longo 1 mm. lato basi obscure auriculato, lobo medio brevissimo $\frac{1}{2}$ mm. longo, lobis lateralibus linearibus 6 mm. longis $\frac{1}{2}$ mm. latis apice turbulenter recurvatis. Columna $\frac{1}{2}$ mm. longa. Staminodia globosa breve stipitata.

Hab. Taihoku: Sensui, leg. T. Kawakami et Y. Shimada, Mart. 1908, (No. 4267).

var ? Caulis gracilis erectus 40-50 cm. longus inferiore foliatus superiore florifer ima basi vaginatus. Folia linearilanceolata 15 cm. longa 8 mm. lata apice acuminata basi vaginata caulem amplectantia, folia superiora angustiora minora, inferiora vaginiformia, vaginis 4-5 cm. longis, ore obliquis. Spicæ elongatæ 20 cm. longæ dense floratæ, bracteis ovato-lanceolatis 5 mm. longis 2 mm. latis acuminatis, floribus minoribus. Sepala ovato-oblonga æqualia $2\frac{2}{3}$ mm. longa $1\frac{1}{3}$ mm. lata apice obtusa basi leviter connata 1-nervia. Petala sepalo æquilonga lineari

$2\frac{2}{3}$ mm. longa $\frac{1}{3}$ mm. lata. Labellum antice patens 6 mm. longum angustum basi dilatatum obscure auriculatum ad medium lobatum, lobo medio brevissimo $\frac{1}{2}$ mm. longo, lobis lateralibus filiformibus $3\frac{1}{2}$ mm. longis apice superne recurvatis. Columna brevissima $\frac{1}{3}$ mm. longa, staminodia cum stipitibus complanatis spathulata.

HAB. Nantō: Musha, T. KAWAKAMI et U. MORI, Aug. 1906, (No. 1242); Randaizan, leg. B. HAYATA et U. MORI, Aug. 1908, (No. 7092); Mt. Morrison, leg. T. KAWAKAMI et U. MORI, Oct. 1906, (Nos. 2333 et 2315).

Differs from the type in having much smaller flowers and more slender leaves.

Platanthera RICH.

Platanthera brevicalcarata HAYATA sp. nov. Caulis erectus cum racemis 10-20 cm. longus inferiore foliatus. Folia oblonga 3 cm. longa, $1\frac{1}{2}$ cm. lata, apice obtusa basi contracta in petiolum brevem contracta. Racemi (præter pedunculum) 3 cm. longi laxiflorati, bracteis longe ovatis 8 mm. longis. Sepala patentia subæquilonga oblonga 3 mm. longa 1 mm. lata. Petala erecta ovata 2 mm. longa 1 mm. lata apice obtusa basi valde obliqua. Labellum oblongum 3 mm. longum $1\frac{1}{2}$ mm. latum integrum basi calcaratum, calcari 2 mm. longo 1 mm. lato vix recurvo. Columna brevissima.

HAB. in monte Morrison, leg. T. KAWAKAMI, (No. 2332).

Platanthera longicalcarata HAYATA sp. nov. Caulis erectus cum racemis terminalibus 40 cm. longus inferiore foliatus. Folia oblonga sessilia 12 cm. longa 3 cm. lata apice obtusa basi angusta caulem amplectantia. Racemi (præter pedunculum) 10 cm. longi laxe florati, bracteis lanceolatis 13 mm. longis acu-

minatis. Sepala subæqualia patentia, posticum latius late ovatum 3 mm. longum 2½ mm. latum apice obtusum, lateralia angustiora 1½ mm. lata. Petala sepalo angustiora circ. 3 mm. longa 1 mm. lata basi dilatata obliqua. Labellum basi calcaratum, calcari 3 mm. longo, lobo medio ovato plano 3 mm. longo 2 mm. lato apice obtuso, lobis lateralibus cum columna continuis minutis ; columna brevissima.

Hab. Randaizan, leg. B. Hayata et U. Mori, Aug. 1908 ; Ganzan, in monte Morrison, ad 9141 ped. alt., leg. S. Nagasawa, (No. 697), Oct. 1905.

Near *P. usuriensis* Maxim., but differs from it by the broader petals and ovate middle-lobe of the lip.

Platanthera obcordata Lindl. ; Matsum. et Hayata Enum. Pl. Formos. p. 419.

Hab. Nantō : Randaizan, leg. T. Kawakami et U. Mori, Juli. 1907, (No. 3482).

Observ. Caulis erectus gracilis minute brevissime hirtellatus, 35 cm. longus ad totam longitudinem foliatus superne florifer. Folia alterna sessilia oblonga 3 cm. longa 12 mm. lata apice rotundato-acuta basi in vaginam brevem contracta amplexicaulia, vaginis 3 mm. longis. Flores ad exillas foliorum superiorum solitarii vel racemosi, racemis 10 cm. longis. Flores mediocres 1½ cm. in diametro. Sepala inæqualia erecto-patentia, posticum oblongo-angustatum 8½ mm. longum 2⅔ mm. latum apice rotundato-acutum, lateralia latiora ovata 8 mm. longa 3 mm. lata apice attenuato-obtusa basi rotundata valde obliqua latere labelli connata. Petala ovato-oblonga 7 mm. longa 2 mm. lata basi obliqua ad basin columnæ connata apice attenuato-obliqua. Labellum 13 mm. longum unguiculatum, unguis basi columnæ connatus in calcar

productus, calcari latissimo 5 mm. longo, ore 4 mm. in diametro, lamina obovato-rotundata 1 cm. longa 8 mm. lata apice emarginata margine crispata prope medium parce 3-lamellata, lamellis brevissime hirtellatis. Columna 2 mm. longa.

Habenaria Willd.

Habenaria ciliolaris Kränzl. in Engl. Bot. Jahrb. XVI. (1892), p. 169 ; Forbes et Hemsl. Ind. Fl. Sin. III. p. 58.

Hab. Nantō : Tōsha, leg. T. Kawakami et U. Mori, Juli. 1907, (No. 3210) ; Nantō : Randaizan, leg. B. Hayata et U. Mori, Juli. 1907, (Nos. 3481 et 7093).

Distrib. Chekiang, Hupeh, Hongkong.

Observ. Caulis erectus 50 cm. longus inferne foliatus a medio superne bracteatus barbatus sulcatus. Folia ovato-lanceolata 16 cm. longa 3½ cm. lata apice acuta basi attenuata ; vaginis 3 cm. longis foliatis a medio superne bracteiformibus, bracteis ovato-lanceolatis 3½ cm. longis 8 mm. latis apice acuminatis basi rotundatis. Racemi 18 cm. longi remote florati parce barbati, barbis glandulosis, bracteis ovato-acuminatis 1½ cm. longis 7 mm. latis, floribus mediocribus 1½ cm. in diametro, ovariis longis pedicelliformibus 2 cm. longis. Sepala inæqualia, posticum erectum galeiforme 5½ mm. longum, lateralia alæformia 8 mm. longa 4 mm. lata obtusa postice reflexa. Petala multo angustiora falcata 6 mm. longa ovato-lincaria 6 mm. longa basi 2 mm. lata latere inferiore reflexa cum sepalo postico connata galeam formantia. Labellum cum columna brevissime connatum basi longe calcaratum, calcari 23 mm. longo, apice dilatato, ore 3 mm. in diametro, medio attenuato filiformi basin dilatato saccato ima basi acuto, lamina profunde 3-partita, segmentis æqualibus tentaculiformibus filformibus 2 cm. longis. Columna brevissima apoda,

rostello inter loculos antheræ late triangulari basi divaricato sub tubo antheræ producto; stigma 2-lobum in processos elongatos 2 mm. longos productum, lobis ad basin labelli connatis; antheræ loculis erectis divaricatis obovatis basi attenuatis 5 mm. longis basi horizontaliter productis cum ramis rostellorum adnatis ima liberis. Pollinia grosse granulosa longe globosa complanata 1½ mm. longa, caudiculis valde elongatis 4 mm. longis, anthera dehiscente glandulis nudis affixis. Staminodia triangularia infra medio ramos rostelli affixa.

Habenaria goodyeroides D. Don.; Matsum. et Hayata Enum. Pl. Formos. p. 419, (sub *Peristylo*).

Hab. Nantō: Busanryō, leg. T. Kawakami et U. Mori, Juli. 1907; Risekizan, leg. T. Kawakami et U. Mori, Juli. 1907, (No. 3471).

Observ. Caulis elongatus 60 cm. longus glaber, partibus inferioribus aphyllis, mediocribus foliis congestis, superioribus aphyllis floriferis, partibus aphyllis infra folia 25 cm. longis vaginatis, vaginis 5 cm. longis remote sitis ore leviter delatatis apice truncatis, partibus foliatis 7 mm. longis 5-6-foliatis. Folia oblonga 13 cm. longa 5 cm. lata apice obtusa acuta basi contracta in vaginam amplexicaulem attenuata, vaginis 2½ cm. longis, squamis superne minoribus ovato-lanceolatis 2 cm. longis. Spicæ elongatæ 15 cm. longæ dense floratæ, bracteis ovato-lanceolatis 13 mm. longis apice aristato-acuminatis, floribus minoribus. Sepala inæqualia subpatentia, posticum ovatum 4½ mm. longum 3 mm. latum apice obtusum, lateralia angustiora basi obliqua cum petala adnata apice dorso breve apiculata. Petala sepalo latiora late oblonga 4½ mm. longa 2½ mm. lata apice obtusa basi valde oblique labello connata. Labellum liguliforme

5 mm. longum 4 mm. latum apice dilatum 3-lobatum, (lobo medio latissimo triangulari 3 mm. longo totiusque lato apice obtuso, lobis lateralibus angustioribus), basi calcaratum, calcari 2 mm. longo ore contracto 1½ mm. lato; discus basi 2-lamellatus, a medio sursum 1-lamellatus; staminoidia 2 mm. longa angustata.

This form has narrowed leaves and lamellate discs on the lip.

Habenaria tentaculata REICHB. var. **acutifolia** HAYATA n. v. Caulis erectus elongatus 40 cm. longus basi 2-3-foliolatus, cæterum squamis oblongis 1½ cm. longis acutis instructus. Folia sessilia oblonga 8 cm. longa 2 cm. lata acuta basi caulem amplectantia. Spicæ elongatæ 13 cm. longæ, bracteis ovato-lanceolatis 8 mm. longis acuminatis, floribus minoribus 4 mm. in diametro. Sepala æqualia concava erecta oblonga 3½ mm. longa 2 mm. lata apice rotundata. Petala sepalo æquilonga ovata 3⅓ mm. longa 1⅔ mm. lata apice acute obtusa. Labellum basi calcaratum, calcari 2 mm. longo oblongo, apice 3-lobatum, parte indiviso 2 mm. longo totiusque lato, lobo medio angustato 2 mm. longo apice obtuso, lobis lateralibus linearibus 7 mm. longis divaricatis. Columna brevissima; stigma antice productum divaricatum; staminodia minuta lamellata.

HAB. Shintengai, Jan. 1904, leg. S. NAGASAWA.

Differs from the type by the acute oblong leaves.

Hemipilia LINDL.

Hemipilia formosana HAYATA sp. nov. Caulis 20 cm. longus glaber basi 1-foliatus, racemo 7 cm. longo pauciflorato, bracteis ovato-lanceolatis vel lanceolatis 7 mm. longis. Folia rotundato-cordata 6 cm. longa 5½ cm. lata margine integra vel parce

crispata. Flores minores 13 mm. longi 8 mm. lati. Sepala oblonga inæqualia patentia, posticum concavum oblongum 5½ mm. longum 3 mm. latum utrinque obtusum, lateralia patentia obliqua 5 mm. longa 3½ mm. lata basi contracta. Petala obliqua obovata 7 mm. longa 3 mm. lata apice obtusa basi acuta a latere inferiore cum unguibus labellorum connata. Labellum cum columna continuum patens, latiusculum basi in calcar productum, calcari longo 13 mm. longo 1 mm. lato ore dilatato 3 mm. in diametro, lamina rhombeo-obovata 7 mm. longa totiusque lata apice rotundato-emarginata basi cuneato-contracta medio calloso-lamellata Columna brevissima, rostello inter antheræ loculos valde elevato-producto.

Hab. in monte Morrison, ad 8500 ped. alt., leg. T. Kawakami et U. Mori, 1906, Oct. (No. 2331).

This is very near *Hemipilia cordifolia*, but quite distinguishable by the larger spur and not lobed lamina of the lip.

Hæmodoraceæ.

Ophiopogon Ker.

Ophiopogon japonicus Ker.; Forbes et Hemsl. Ind. Fl. Sin. III. p. 78; Matsum. et Hayata Enum. Pl. Formos. p. 426.

Hab. Randaizan, leg. T. Kawakami et U. Mori, 1908, Aug. (No. 7094).

Dioscoreaceæ.

Dioscorea Linn.

Dioscorea dæmona Roxb. var. **reticulata** Hook. f.; Forbes et

HEMSL. Ind. Fl. Sin. III. p. 91 ; MATSUM. et HAYATA Enum. Pl. Formos. p. 432.

HAB. Kagi, Tikutōchi, leg. T. KAWAKAMI et Y. SHIMADA, 1907, Aug. (No. 4199).

Dioscorea glabra ROXB. ; HOOK. f. Fl. Brit. Ind. VI. p. 294 ; FORBES et HEMSL. Ind. Fl. Sin. III. p. 91.

HAB. Kagi, Tikutōchi, leg. T. KAWAKAMI et Y. SHIMADA, Aug. 1908, (No. 4217) ; Shintiku, Shimpo, (No. 4404) ; Keelung, leg. U. FAURIE, Mai. 1903 ; Taruko, leg. G. NAKAHARA, Jan. 1905, (No. 715).

DISTRIB. China : Kiangsi, Kwangtung, Hainan. From the subtropical Himalayas to the Malay peninsula.

Roxburghiaceæ.

Stemona LOUR.

Stemona tuberosa LOUR. ; FORBES et HEMSL. Ind. Fl. Sin. III. p. 95 ; MATSUM. et HAYATA Enum. Pl. Formos. p. 434.

HAB. Taiko, (No. 2).

Liliaceæ.

Smilax LINN.

Smilax arisanensis HAYATA sp. nov. Rami subteretes exsiccato fusco-rubescentes glabri gracillimi parcissime remotissime spinulati, spinis rectis 2 mm. longis. Folia lanceolata plus minus falcatim recurvata vel ovato-lanceolata 6-11 cm. longa 1-2½ cm. lata apice acuminata plus minus falcata basi rotundata vel obtusa utrinque glabra, nervis et venulis distincte elevatis dis-

tincte 3-nervia, etiamque 2-nerviis basilaribus prope marginem arcte ascendentibus, petiolis 5 mm. longis basi cum stipulis ramos semiamplectantibus, stipulis petiolum in longitudine ½-plo æquantibus cum petiolis connatis, ad apicem stipularum cirrhiferis, cirrhis 4-5 cm. longis revolutis. Flores umbellati, umbellis longe pedunculatis, pedunculis axillaribus solitariis 5 cm. longis gracillimis subteretibus simplicibus. Fructus pedicellati, pedicellis 8-10 mm. longis a basi cernuis. Baccæ globosæ 4 mm. in diametro 3-spermæ. Semina facie subplana dorso convexa 3½ mm. longa 3 mm. lata sub lente minute reticulata subnitida fusco-rubescentia.

Hab. Arizan, leg. G. Nakahara, Nov. 1906; Randaisan, leg. B. Hayata et U. Mori, 1908, Aug. (No. 7046).

Near *S. lanceæfolia* Roxb., but differs from it in having much narrower leaves and fruits nodding on a common peduncle; also near *S. flaccida* Wright, from which this differs by the entire lanceolate leaves quite rounded at the base; from *S. glabra* Roxb. by the long common peduncles.

Smilax elongato-reticulata Hayata sp. nov. Suffrutex, caulibus ut videntur basi prostratis, ascendentibus erectis teretibus plus minus complanatis lævibus subrectis plus minus flexuosis parcissime spinulatis, spinis patentibus 2 mm. longis. Folia linearilanceolata vel lanceolata 8½ cm. longa 1 cm. lata apice gradatim attenuata mucronato-obtusa basi rotundata utrinque glabra subtus plus minus glauca margine revoluta 3-nervia, nervo centrali supra leviter subtus prominente elevato, nervis lateralibus plus minus prominulis, venulis inter nervos utrinque plus minus distincte reticulatis, reticulis elongatis. Flores umbellati, umbellis 1 cm. longis totiusque latis longe pedunculatis, pedunculis gracilibus plus minus complanatis 2 cm. longis solitariis

basi perulatis. Flores recto-patentes 3 mm. longi pedicellati, pedicellis 5 mm. longis sub quoque flori 1-bracteatis, bracteis lanceolatis 1½ mm. longis. Segmenta perianthii 6, æquilonga 4½ mm. longa, 3-exterioribus latioribus ovatis 4½ mm. longis 2½ mm. latis apice obtuso-acutis, basi cum staminibus subulatis, 3-inferioribus angustioribus obovato-angustatis apice obtusis basi attenuato-angustatis subincrassatis dorso plus minus carinatis. Ovarium glabrum elongato-ovatum 2½ mm. longum 1½ mm. latum apice ad basin stylorum constrictum, stylis 3 brevibus interiore stigmatosis 1½ mm. longis a medio recurvatis.

HAB. Arizan, leg. T. KAWAKAMI et U. MORI, 1908, Mart. (No. 3568).

Near *S. lanceæfolia* but differs from it by the much narrower leaves and broader sepals.

Smilax elongato-umbellata HAYATA sp. nov. Rami complanati, obscure striati flexuosi brevissime et parcissime spinulati, spinis horizontaliter ½ mm. longis. Folia membranacea ovato-oblonga vel oblongo-lanceolata 53 mm. longa 23 mm. lata aristato-acuta vel-acuminata basi rotundata margine integra 3-5-nervia, nervis et venis utraque prominentibus, inter venas reticulatis, supra glabra subtus glauca, petiolis 8 mm. longis a facie complanatis stipulis paullo brevoribus, stipulis petiolo connatis apice cuspidatis, (cuspidibus linearibus liberis 5 mm. longis), primum membranaceis demum coriaceis cuspidibus demum ad cirrhos elongatos 5 cm. longos abeuntibus. Flores 5 mm. longi, racemoso-umbellati longe pedicellati, pedicellis 2½ cm. longis, umbellis longe pedunculatis, pedunculis axillaribus 4 cm. longis recurvis simplicibus vel 2-3-ramosis sub quoque ramo 2-bracteatis, bracteis stipula conformibus, sub basi pedunculorun 1-2-perulatis, perulis

majusculis latissimis 8 mm. longis 13 mm. latis plicatis basin pedunculorum amplectantibus medio coriaceis margine membranaceis. Umbellæ 3 cm. longæ 4 cm. latæ, pedicellis divaricatis basi dilatatis, sub quoque pedicello 1-bracteatis, bracteis lanceolatis 1½ mm. longis, rhachibus umbellarum 6 mm. longis. Flores erecto-patentes 6½ mm. longi, segmentis perianthii erecto-patentibus 3-exterioribus majoribus oblongo-ovatis apice obtusis 6½ mm. longis 3 mm. latis integris margine plus minus incurvis, 3-interioribus angustioribus 6½ mm. longis 1½ mm. latis lanceolatis apice obtusis plicato-recurvis. Stamina 6, segmentis perianthii opposita 5 mm. longa, filamentis basi cum segmentis connatis, antheris ovatis 1⅔ mm. longis ¾ mm. latis apice acuto-obtusis. Rudimentum ovarii 0.

Hab. Arizan, leg. T. Kawakami et U. Mori, 1908, Mart. (No. 3639).

This is very distinct from any species of the genus, in having elongate raches of umbels.

Smilax glabra Roxb.; Hance in Journ. Bot. (1872) p. 102; Benth. Fl. Hongk. p. 369; A. DC. Monogr. Phanerog. I. p. 60; Hook. f. Fl. Brit. Ind. p. 302; Forbes et Hemsl. Ind. Fl. Sin. III. p. 97.

Hab. Goshizan, leg. T. Kawakami, 1905, Dec. (No. 1254).

Smilax gracillima Hayata sp. nov. Rami gracillimi glaberrimi subangulati latere sulcati pallidissimi. Folia petiolata non cirrhata chartacea oblonga oblongo-ovata rarius plus minus obliqua utrinque acuta vel cuspidato-acuta vel basi subito-attenuata 6½ cm. longa 3 cm. lata integra 3-nervia, nervis ad apicem convergentibus, supra pallidissima glabra, (nervis et venis distincte tenuissime elevatis), subtus glaucissimo-albicantia, nervis

et venis prominulis, petiolis 5 mm. longis a facie complanatis supra sulcatis juxta laminas tardius articulatim rumpentibus basi stipulatis, stipulis lanceolatis 3 mm. longis a medio deorsum petiolo connatis apice liberis.

HAB. Giran, Chūrei, leg. T. KAWAKAMI et U. MORI, 1906, Juni. (No. 1379).

Near *S. megalantha*, *S. hypoleuca* BENTH. and *S. stans* MAXIM., but differs from them by the leaves which are acute on both ends.

Smilax lanceæfolia ROXB.; FORBES et HEMSL. Ind. Fl. Sin. III. p. 99; MATSUM. et HAYATA Enum. Pl. Formos. p. 435.

HAB. Randaizan, (No. 7026); Nantō: Kurokōzan, (No. 3169); Horisha, (No. 35); Uraisha, (No. 2707), leg. T. KAWAKAMI et U. MORI; Akō: Tanashū, leg. G. NAKAHARA, 1907.

Smilax liukiuensis HAYATA sp. nov. Rami teretes glabri inermes. Folia ovato-acuminata vel ovato-lanceolata 5-7½ cm. longa 2-3½ cm. lata apice acuminata basi rotundata utrinque glabra 3-nervia, inter nervos reticulata utraque pagine distincte elevato-reticulata, margine nervis marginalibus marginata, tenuiter coriacea subtus pallidiora, petiolis 5-10 mm. longis prope basin 2-cirrhiferis, stipulis angustissimis cum petiolis connatis. Flores umbellati, umbellis pedunculatis, pedunculis solitariis axillaribus 1½ cm. longis valde complanatis basi 1-perulatis, perulis ovatis 4 mm. longis pedunculum amplectantibus. Baccæ depresso-globosæ 6 mm. in diametro 3-5-spermæ, pedicellis 6 mm. longis, sub quoque 1-bracteatis, bracteis late triangularibus acutis 1 mm. longis. Semina quadrantiformia facie acuta dorso rotundata 3½ mm. longa 2⅔ mm. lata rubescentia subnitida.

Hab. Okinawa, leg. Y. Tashiro, Mart. 1887.

Smilax nervo-marginata Hayata. Rami teretes fulvo-cinerascentes inermes sub lente minute muricato-asperi, ramulis foliatis valde flexuosis. Folia coriacea lineari-lanceolata vel ovato-lanceolata vel ovato-oblonga circ. 10 cm. longa 1-4½ cm. lata apice acuminata vel acuta basi rotundata vel cordata, margine nervis validissimis prominentibus marginata repandato-integra utraque pagine glabra distincte elevato-reticulata 3-nervia, petiolis 1½ cm. longis subteretibus non sulcatis prope basi 2-cirrhiferis, cirrhis 2-5 cm. longis revolutis, stipulis circ. obsoletis. Flores ignoti.

Hab. Okinawa, leg. S. Tanaka, 1891, (No. 238, b.).

As the leaves of the present plant are very remarkable and distinct from any species of the genus, I have taken this occasion to describe it, though the specimen is very imperfect and gives no complete account for the species.

Smilax Oldhami Miq. in Ann. Mus. Bot. Lugd. Bat. III. p. 150; A. DC. Monogr. Phanerog. I. p. 53; Forbes et Hemsl. Ind. Fl. Sin. III. p. 100; Matsum. et Hayata Enum. Pl. Formos. p. 434.

Hab. Taruko, leg. G. Nakahara, Juni. 1906, (No. 722).

Smilax plani-peduncula Hayata sp. nov. Caulis suffrutescens plus minus complanatus obtuse angulatus vel subteres glaber foliatus. Folia alterna a se 10 cm. remota, petiolata, membranaceo-chartacea ovata oblongo-ovata vel rotundato-cordata 6-8 cm. longa 4-7 cm. lata apice breve cuspidato-acuta plus minus subplicato-recurva basi late acuta rotundata vel leviter cordata margine subundulato-integra vel subintegra, interdum angustissime marginata vel non marginata, utraque pagine glabra, nervis et venulis distincte elevatis, subtus pallidiora 5-nervia, inter nervos

oblique-reticulata, nervis ad apicem convergentibus, venis lateralibus arcte secus marginem ascendentibus, petiolis verticaliter (a facie) valde complanatis laminam in longitudine $\frac{1}{3}$ plo æquantibus $2\frac{1}{2}$ cm. longis $1\frac{1}{4}$ mm. latis supra sulcatis subtus angustissime alatis basi dilatatis stipuliformibus subamplexicaulibus prope basin 2-cirrhis instructis, (cirrhis circ. 8 cm. longis spiraliter revolutis), infra laminas tardius rumpentibus. Umbellæ axillares solitariæ longe pedunculatæ, pedunculis 5 cm. longis, valde complanatis $1\frac{1}{4}$ mm. longis. Fructus pedicellati, pedicellis æquilongis 13 mm. longis plus minus complanatis apice plus minus dilatatis sub quoque pedicello 1-bracteatis, bracteis cuspidato-triangularibus 1 mm. longis totiusque latis. Baccæ obliquæ globosæ 8 mm. in diametro brevissime rostratæ, rostris truncatis vel obtuse apiculatis, 3-4-spermæ. Semina quadrantiformia $4\frac{1}{2}$ mm. longa utrinque obtusa angulata, (angulis obtusis), rubescentia.

HAB. Kurarusha, leg. G. NAKAHARA, Dec. 1906, (No. 877).

Near *S. China* LINN., but differs from it in having much longer and flattened peduncles, 3-seeded black berries, and ovate leaves which are acute at the apex and rounded at the base.

Smilax prolifera ROXB. ; HOOK. f. Fl. Brit. Ind. VI. p. 312.

HAB. Banchoryō, Rokkiri, leg. G. NAKAHARA, Oct. 1905, (No. 591) ; Rinōkutsu, leg. S. KUSANO, 1909.

DISTRIB. Tropical and Western Himalaya ; Deccan peninsula and Ceylon.

Smilax randaiensis HAYATA sp. nov. Suffrutescens ut videtur 30 cm. alta suberecta vel scandento-erecta, ramis subcomplanatis flavo-pallidis glabris valde flexuosis basi perulatis, perulis ovatis rotundato-apiculatis, ramos amplectantibus. Folia lanceolato-ovata

vel ovato-oblonga 5½ cm. longa 22 mm. lata apice acuminata rotundata basi rotundato-cordata margine subintegra supra glabra exsiccato nigricantia subtus glauca 5-nervia, nervis 3 centralibus rectiusculis, 2-lateralibus repandatis, inter nervos reticulata, intra reticula venulis liberis ramulosis, venis venulisque utrinque distincte elevatis, petiolis 1 cm. longis cum stipulis connatis caulem amplectantibus, stipulis circ. 9 mm. longis cum petiolis connatis apice cirrhiferis, cirrhis 1 cm. longis filiformibus recurvatis. Fructus 4-5 umbellati, pedicellis 1½ cm. longis sub quoque 1-bracteatis, bracteis ovato-cuspidatis 1½ mm. longis. Umbellæ pedunculatæ, pedunculis cernuis axillaribus solitariis complanatis. Baccæ globosæ 6 mm. in diametro 1-spermæ. Semina globosa plus minus complanata minute impresso-punctata nitida rubescentia 4 mm. in diametro.

Hab. Randaizan, leg. B. Hayata et U. Mori, 1908, Aug. (No. 7016).

Near *S. stans* Maxim., but differs from it in having narrower leaves and umbellate flowers. Also near *S. biflora* Sieb., from which this is distinguishable by the nearly ovate lanceolate leaves with a rotundate or slightly cordate base; the leaves of this plant are usually nodding on petioles.

Smilax Sieboldi Miq. var. **formosana** Hayata n. v. Rami angulati ad angulos angustissime alati glabri spinosi, spinis transverse patentibus 2 mm. longis, ramulis divaricatis, basi ramulorum 1-perulatis, perulis ovatis ramulos amplectantibus. Folia petiolata ovato-lanceolata vel oblongo-ovata 6½ cm. longa 22 mm. lata apice acuminata vel cuspidato-acuminata basi rotundata juxta petiolum subito acuto-attenuata utrinque glabra, nervis et venis venulisque distincte elevatis, chartaceo-membranacea 5-nervia,

3-nervis centralibus subrectis, 2-nervis lateralibus repandatis, petiolis 1 cm. longis supra sulcatis subtus carinatis sub lamina tardius rumpentibus basi cum stipulis connatis ramulos amplectantibus, stipulis angustatis cum petiolo connatis apice liberis membranaceis circ. 4 mm. longis apice cirrhiferis, cirrhis demum duriusculis revolutis. Umbellæ axillares solitariæ pedunculatæ, pedunculis 1½ cm. longis complanatis. Fructus 6-7-umbellati, pedicellis 5 cm. longis. Baccæ globosæ, 4½ mm. in diametro, 1-spermæ. Semina globosa 4 mm. in diametro nitida sub lente minute punctata.

HAB. Arizan, leg. G. NAKAHARA, Nov. 1906.

This slightly differs from the type in the leaves and flowers.

Smilax stenopetala A. GRAY ; FORBES et HEMSL. Ind. Fl. Sin. III. p. 101 ; MATSUM. et HAYATA Enum. Pl. Formos. p. 434.

HAB. Bongari, (Botansha, No. 902), (Chioran, No. 290), leg. G. NAKAHARA ; Shifun. leg. C. OWATARI ; Shirōsha, Suihenkiaku, (No. 49), leg. T. KAWAKAMI et U. MORI.

Lilium LINN.

Lilium Konishii HAYATA sp. nov. Caulis teres glaber ut videtur plus minus tortuosus sursum pauciramosus ad apicem quoque ramorum 1-floratus, ramis a cauli angulo 50° divaricatis. Folia lanceolata 7-15 cm. longa 1-3 cm. lata apice acuminata plus minus falcato-recurvata vel recta basi obtusa in petiolum plus minus attenuata utrinque glabra crassiuscula membranacea vel tenuiter chartacea, supra venis parallelis plus minus conspicuis, subtus distincte 3-nervia, (nervis prominentibus), plus minus pallida, venis inter nervos inconspicuis. Flores cærulei longe pedunculati, pedunculis 14 cm.

longis simplicibus vel pauciramosis ascendentibus apice recurvatis. Perianthii segmenta recurvato-patentia lanceolata 7 cm. longa 2 cm. lata sursum angustata infra medium latissima prope basin acuto-attenuata ad basin 3 mm. lata, apice obtusa dorso carinato-cornuta, (cornu unciformi plus minus recurvo vel subrecto 5 mm. longo), intus (præter basin) glabra, circ. 17-nervata, nervis parallelis undulatis utrinque pagine elevatis erecto-ascendentibus ad marginem evanescentibus, hac atque illac cum venis obliquis rarius anastomosantibus prope apicem generaliter plus minus reticulatis, ad apicem marginemque omnibus liberis, prope basin omnibus convergentibus, prope basin intus medio incrassata colorata, (partibus incrassatis 3 mm. latis prope medium evanescentibus), cristato-tuberculata, (tuberculis ad nervos dispositis columnaribus 1 mm. longis), dorso glabra medio prominente carinato-costata, costa infra apicem ad cornu apicale abeunte basi plus minus dilatata. Stamina 6 cm. longa, filamentis glabris filiformibus 5½ cm. longis complanatis prope apicem teretibus basi 2 mm. latis dorso carinatis, antheris linearibus 1½ cm. longis basi latissimis 3½ mm. latis a medio versatiliter affixis. Ovarium cylindricum 17 mm. longum 2 mm. latum superiore latius apice truncatum, ut videtur multicostatum basi attenuatum, stylo filiformi 5 cm. longo apice plus minus dilatato.

Hab. Dandaigai, leg. N. Konishi, 1908, Aug. (No. 95).

Near *Lilium japonicum*, but differs from it in having narrower leaves; also near *L. rubellum*, but distinguishable from it by the larger leaves and maculate segments.

Disporum Salisb.

Disporum Kawakamii Hayata sp. nov. Caulis 2-3-ramosus

glaber striatus vel sulcatus. Folia lanceolata 10-12 cm. longa 14 mm.-22 mm. lata apice acuminata (acuminibus linearibus falcatis), basi obtusa utrinque glabra membranacea distincte 3-nervia, inter nervos paralleliter 6-nervulosa vel obscure 7-nervulosa, nervis et nervulis supra leviter subtus prominente elevatis, brevissime petiolata, petiolis 3-5 mm. longis. Flores umbellati, umbellis paucifloratis generaliter 3-floratis terminalibus oppositifoliis sessilibus, pedicellis florum 2½ cm. longis. Perianthium erectum, segmentis 6 æqualibus 21 mm. longis obovato-oblongis apice obtusis basi plus minus angustioribus extus glabris prominente costatis, utraque latere 1-nervulis plus minus prominentibus, basi latissime calcaratis, (calcaribus 3 mm. longis 2½ mm. latis obtusis), intus prope basin hirtellatis, segmentis interioribus plus minus angustioribus. Stamina 6, segmentis opposita 13 cm. longa, filamentis complanatis 9 mm. longis 2 mm. latis glabris, antheris ovato-oblongis 4½ mm. longis 2 mm. latis, connectivis apice brevissime obtuso-productis. Ovarium glabrum obovato-ellipticum 4½ mm. longum 2½ mm. latum apice obtusum basi plus minus in stipitem brevissimum attenuatum, stylo elongato-columnari 9 mm. longo apice 3-fisso, ramis 2 mm. longis, apice recurvis intus stigmatosis. Fructus (No. 1726) ut videnter globoso-elliptici nigricantes 6 mm. longi.

Hab. Kagi : Suitōryō, leg. T. Kawakami, 1908, Mart. (No. 3493); in monte Morrison, (No. 1726).

Near *D. calcaratum* Don., but differs from it in having much shorter spurs, obtuse segments, and much narrower leaves.

Disporum pullum Salisb.? Forbes et Hemsl. Ind. Fl. Sin. III. p. 143; Matsum et Hayata Enum. Pl. Formos. p. 443.

Hab. Taichū, Chūtokō, leg. T. Kawakami et U. Mori, 1906, Aug. (No. 1210).

Disporum Shimadai Hayata sp. nov. Herba erecta 40 cm. alta, caulibus a basi usque ad prope apicem simplicibus efoliatis squamatis, (squamis vaginiformibus 4 cm. longis apice acuminatis superiore lanceolatis 3 cm. longis semi-amplexicaulibus rubescentibus), apice 2-3-ramosis foliatis. Folia ad ramos apicales alternatim disposita subsessilia ovato-oblonga vel ovato-lanceolata 7½ cm. longa 2 cm. lata 3-nervia, (nervis distinctis), inter nervos tenuissime nervulosa apice acuta basi obtusa utraque glabra subtus pallidiora. Flores solitarii terminales vel axillares oppositifolii, pedicellis 18 mm. longis erectis. Perianthii segmenta æquiformia erecta late spathulata 19 mm. longa 8 mm. lata apice rotundata deorsum sensim attenuata obscure 9-nervata, (nervis 3 distinctis ad apicem convergentibus), utraque glaberrima basi calcarata, calcaribus 2 mm. longis 1½ mm. latis obtusis. Stamina 6, segmentis opposita 14 mm. longa, filamentis complanatis 11 mm. longis 1 mm. latis, antheris lineari-oblongis 3 mm. longis 1 mm. latis, locellis plus minus undulatis. Ovarium obovatum 3 mm. longum 2 mm. latum apice rotundatum, stylo 13 mm. longo filiformi-columnari apice 3-fido, ramis 4 mm. longis suberectis apice rotundato-patentibus.

Hab. Kelung: Masoku, leg. T. Kawakami et Y. Shimada, 1907, Mart. (No. 4311).

Near *D. sessile* Don., but differs from it in having quite opened segments and narrower leaves.

Paris Linn.

Paris formosana Hayata sp. nov. Herba robusta verisimiliter cum pedunculis 120 cm. alta, caulibus glabris teretibus rectis 9 mm. in sectione. Folia ad apicem caulis 8-verticillata

petiolata oblonga vel ovato-oblonga 28 cm. longa 11 cm. lata apice subito acuminata basi acuta brevissime attenuata margine marginata herbaceo-membranacea plus minus crassiuscula utrinque glabra subtus pallidiora supra basin distincte 3-nervia, etiamque plus 2-nervis inconspicuis, nervis margine subparallelis ad apicem convergentibus, venis inter nervos obliquis, inter venas reticulato-venulosis, reticulis elongato-obliquis, nervis basi gradatim attenuato-convergentibus, nervis venisque utraque pagine subplanis conspicuis, petiolis 5 cm. longis ut videntur complanatis. Pedunculi ad centrum verticilli foliorum solitarii recti validiusculi circ. 40 cm. longi glabri 5 mm. in sectione teretes. Perianthium 2-seriatim partitum, basi plus minus campanulatum cum ovario adnatum, segmentis exterioribus 6 herbaceo-membranaceis majusculis oblongo-lanceolatis 9 cm. longis 2 mm. latis apice obtuso-acuminatis basi supra basin subito attenuatis ad stipitem 7 mm. longum 3 mm. latum abeuntibus, nervis et venis ut foliis, segmentis interioribus linearibus $2\frac{1}{2}$ cm. longis 1 mm. latis obtusis. Stamina 12, cum segmentis opposita 23 mm. longa, filamentis complanatis 6 mm. longis, antheris linearibus quam filamento 2-plo longioribus, locellis undulatis, connectivis apice $1\frac{1}{2}$ mm. in longitudine productis. Ovarium ovatum sub lente muricatum $1\frac{1}{2}$ cm. longum 11 mm. latum basi cum perianthio adnatum apice depresso-marginatum ad centrum etiamque conico-productum in stylum abeuns, rubro-purpurascens ; styli 6 basi connati 7 mm. longi recurvato-patentes apice revoluti.

Hab. Arizan, leg. T. Kawakami et U. Mori, 1908, Mart. (No. 3573).

Very distinct species which comes near *Paris polyphylla* Smith. The leaves of the present plant have a quite peculiar venation. Although Smith's species shows no small varieties and some of

them have nearly the same appearance as my plant, I have never found any specimens representing the same venation.

Paris polyphylla Smith ; Hook. f. Illust. Himal. Pl. t. 24 ; Hook. f. Fl. Brit. Ind. VI. p. 362 ; S. Moore in Journ. Bot. (1878), p. 138 et (1883), p. 358 ; Forbes et Hemsl. Ind. Fl. Sin. III. p. 145.

Hab. Tōyen, Yubokusha, leg. T. Kawakami et U. Mori, 1907, Mart. (No. 6226).

Distrib. Himalaya and China.

This is very near *P. incompleta* Fisch., but the leaves are oblong, outer segments are much narrower and twice as long as those of that species.

Commelinaceæ.

Commelina Linn.

Commelia auriculata Blume ; Forbes et Hemsl. Ind. Fl. Sin. III. p. 155 ; Matsum. et Hayata Enum. Pl. Formos. p. 448.

Hab. Nantō : Musha, leg. T. Kawakami et U. Mori, 1906, Aug. (No. 1176) ; Tamsui, leg. T. Kawakami et Y. Shimada, 1908, Mart. (No. 4347).

Commelina undulata R. Br. ; Forbes et Hemsl. Ind. Fl. Sin. III. p. 157 ; Matsum. et Hayata Enum. Pl. Formos. p. 449.

Hab. Takaw, leg. B. Hayata et Y. Shimada, 1908, Aug. (No. 97).

Floscopa Lour.

Floscopa scandens Lour. " Fl. Cochinch. p. 193"; C. B. Clarke,

in DC. Monogr. Phanerog. III. p. 265 ; Hook. f. Fl. Brit. Ind. VI. p. 390 ; Forbes et Hemsl. Ind. Fl. Sin. III. p. 158.

Hab. Nantō : Suisha, leg. T. Kawakami et Y. Shimada, 1907, Dec. (No. 5164) ; Randaizan, leg. B. Hayata et U. Mori, 1908, Aug. (No. 7072).

Distrib. China : Kiangsi, Fokien, Kwangtung, Hongkong ; India, Birma, Malay archipelago and Australia.

Juncaceæ.

Juncus Linn.

Juncus modicus N. E. Brown in Forbes et Hemsl. Ind. Fl. Sin. III. p. 165.

Juncus Maximowiczi Hayata Fl. Mont. Formos, p. 229 (non Buch.).

Distrib. Hupeh : Fang, 8000-9000 ft.

Aroideæ.

Pinellia Ten.

Pinellia tuberifera Tenore ; Engl. in DC. Monogr. Phanerog. II. p. 566 ; Hance in Journ. Linn. Soc. XIII. p. 88 ; Forbes et Hemsl. Ind. Fl. Sin. III. p. 174.

Hab. Sharyōtō, leg. T. Kawakami et Y. Shimada, 1908, Mart. (No. 4326).

Distrib. Japan and China.

Arisæma Mart.

Arisæma alienatum var. **formosanum** Hayata n. v. Herba erecta glabra majuscula cum petiolis 60 cm. alta 1-foliata, foliis floribusque coætaneis. Folia longe petiolata verticillatim circ. 13-secta, segmentis oblongo-oblanceolatis 20 cm. longis 4 cm. latis apice acuminatis vel cuspidato-acuminatis basi longe attenuatis supra basin 2 mm.-latis basin plus minus leviter dilatatis 3 mm. latis, petiolis robustis rectis 60 cm. longis basi 7 mm. in sectione a medio usque ad basin vaginiformibus pedunculum involventibus basi vaginatis, vaginis 13 cm. longis membranaceis discoloribus apice obtusissimis multinerviis, basi tubiformibus, tubis $2\frac{1}{2}$ cm. longis. Pedunculus floris ♀ solitarius elongatus 25 cm. longus, partibus vaginiformibus petiolorum involucratus, sursum leviter recurvus liber. Spatha oblongo-lanceolata caudata cum tubo 14 cm. longa $2\frac{1}{3}$ cm. lata, tubo ventricoso-oblongo. Spadix inclusus cylindrico-conicus 17 mm. longus 8 mm. latus, appendice longe filiformi 6 cm. longa recurva a medio deorsum tuberculis filiformibus ascendento-recurvis instructa, (tuberculis 3 mm. longis a latere compressis basi dilatatis). Flores diœcii. Fl. ♀ : Ovarium hexagono-obovoideum $1\frac{1}{2}$ mm. longum 1-loculare 3-ovulatum, stylo subnullo, stigmate pulvinato rubro-marginato.

Hab. Shintiku, leg. T. Kawakami et K. Watanabe, 1907, Aprili.

Very like the type, from which this is distinguishable by the much slender spadix. Also near *A. neglectum* Schott, *A. Leschenaultii* Blume and *A. consanguineum* Schott; but differs from them in having spadix with a long hairy thread-like appendage.

Amorphophallus BLUME.

Amorphophallus hirtus N. E. BROWN in FORBES et HEMSL. Ind. Fl. Sin. III. p. 181 ; MATSUM. et HAYATA Enum. Pl. Formos. p. 458.

HAB. Kōshūn, leg. T. KAWAKAMI, 1906, Mart.

DISTRIB. An endemic plant.

Najadaceæ.

Potamogeton LINN.

Potamogeton crispus LINN. ; FRANCH. et SAVAT. Enum. Pl. Jap. II. p. 15 ; HOOK. f. Fl. Brit. Ind. VI. p. 566 ; FORBES et HEMSL. Ind. Fl. Sin. III. p. 193 ; MATSUM. et HAYATA Enum. Pl. Formos. p. 465.

HAB Kishito, (No. 724).

Zannichellia LINN.

Zannichellia pedicellata BUCH.-HAM.; FORBES et HEMSL. Ind. Fl. Sin. III. p. 197.

HAB. Takaw, leg. B. HAYATA et Y. SHIMADA, 1908, Aug. (No. 122).

DISTRIB. Kiangsu ; Loo-choo islands. Cosmopolitan, excluding Australia.

Cyperaceæ.

Juncellus GRISEB.

Juncellus inundatus CLARKE ; FORBES et HEMSL. Ind. Fl. Sin. III. p. 207 ; MATSUM. et HAYATA Enum. Pl. Formos. p. 470.

Hab. Akō, (No. 611).

Juncellus serotinus Clarke in Forbes et Hemsl. Ind. Fl. Sin. III. p. 208 ; Matsum. et Hayata Enum. Pl. Formos. p. 470.

Hab. Shōriukiu, (No. 533).

Cyperus Linn.

Cyperus diffusus Vahl. ; Clarke in Hook. f. Fl. Brit. Ind. VI. p. 603 ; Forbes et Hemsl. Ind. Fl. Sin. III. p. 211.

Hab. Taitō : (No. 6023).

Cyperus distans Linn. f.; Forbes et Hemsl. Ind. Fl. Sin. III. p. 211 ; Matsum. et Hayata Enum. Pl. Formos. p. 472.

Hab. Hokutō : leg. G. Nakahara, Oct. 1906 ; Tōyen, Yenjorin, leg. T. Kawakami, 1907, Oct. (No. 4657).

Cyperus eleusinoides Kunth ; Forbes et Hemsl. Ind. Fl. Sin. III. p. 212 ; Matsum. et Hayata Enum. Pl. Formos. p. 472.

Hab. Kōshūn : (No. 5016).

Cyperus nutans Clarke in Herb. Kew.

Hab. Taitō : Torekisha, leg. T. Kawakami et Z. Kobayashi, Aug. 1907, (No. 5626).

Compared with a specimen so named at Kew.

Cyperus radiatus Vahl. ; Forbes et Hemsl. Ind. Fl. Sin. III. p. 216 ; Matsum. et Hayata Enum. Pl. Formos. p. 474.

Hab. Akō : (No. 526).

Cyperus tuberosus Rottb.; Forbes et Hemsl. Ind. Fl. Sin. III. p. 219 ; Matsum. et Hayata Enum. Pl. Formos. p. 476.

Hab. Takaw, leg. G. Nakahara, Oct. 1905, (No. 552).

Cyperus uncinatus Poir. ; Bœck. in Linnæa XXXV. p. 502 ; Forbes et Hemsl. Ind. Fl. Sin. III. p. 219.

Hab. Daikō, leg. T. Kawakami et Y. Shimada, Aug. 1907, (No. 4203).

Distrib. Tropics and warm temperate regions of Asia, Africa, and America.

The present specimen is of a form with much broader spikelets. It will prove to be a variety of this species when the floral parts are fully examined.

Cyperus Zollingeri Steud. ; Bœck. in Linnæa XXXVI. p. 352 ; C. B. Clarke in Hook. f. Fl. Brit. Ind. VI. p. 613 ; Forbes et Hemsl. Ind. Fl. Sin. III. p. 219.

Hab. Taitō : Hōkansha, (No. 1524).

Distrib. Yunnan, Hongkong. Tropical Africa and India, extending to Luzon and Queensland.

Mariscus Vahl.

Mariscus microcephalus Presl.; C. B. Clarke in Hook. f. Fl. Brit. Ind. VI. p. 624 ; Forbes et Hemsl. Ind. Fl. Sin. III. p. 221.

Hab. Akō (No. 614).

Distrib. Kwangtung. Common in India and Malaya, extending to Mascarenia.

Mariscus Sieberianus Nees ; Forbes et Hemsl. Ind. Fl. Sin. III. p. 221 ; Matsum et Hayata Enum. Pl. Formos. p. 477.

Hab. Taikō, (No. 69).

Torulinium Desv.

Torulinium confertum Ham. ; Forbes et Hemsl. Ind. Fl. Sin. III. p. 222; Matsum. et Hayata Enum. Pl. Formos. p. 478.

Hab. Nantō, leg. G. Nakahara, (No. 372).

Kyllinga Rottb.

Kyllinga cylindrica Nees.; Bœck. in Linnæa XXXV. p. 415 ; C. B. Clarke in Hook. f. Fl. Brit. Ind. VI. p. 588 ; Forbes et Hemsl. Ind. Fl. Sin. III. p. 223.

Hab. Hokuto, (No. 478).

Distrib. Yunnan. Dispersed in the tropical and subtropical regions of the old world.

Eleocharis R. Br.

Eleocharis capitata R. Br. ; Forbes et Hemsl. Ind. Fl. Sin. III. p. 227 ; Matsum. et Hayata Enum. Pl. Formos. p. 480.

Hab. Taitō, (Nos. 1492, 740 et 1492).

Eleocharis plantaginea R. Br.; Forbes et Hemsl. Ind. Fl. Sin. III. p. 228 ; Matsum. et Hayata Enum. Pl. Formos. p. 481.

Hab. Shinkō.

Fimbristylis Vahl.

Fimbristylis complanata Link. ; Forbes et Hemsl. Ind. Fl. Sin. III. p. 231 ; Matsum. et Hayata Enum. Pl. Formos. p. 482.

Hab. Nantō, (No. 3552).

Fimbristylis schœnoides VAHL. ; FORBES et HEMSL. Ind. Fl. Sin. III. p. 243 ; MATSUM. et HAYATA Enum. Pl. Formos. p. 486.

HAB. Taikō, (No. 62).

Scirpus LINN.

Scirpus erectus POIR. ; FORBES et HEMSL. Ind. Fl. Sin. III. p. 248 ; MATSUM. et HAYATA Enum. Pl. Formos. p. 488.

HAB. Randaizan, leg. B. HAYATA et U. MORI, 1908, Aug. (No. 7061).

Scirpus lacustris LINN.; FORBES et HEMSL. Ind. Fl. Sin. III. p. 250; MATSUM. et HAYATA Enum. Pl. Formos. p. 488.

HAB. Sōryōshō, Sharyōtō, (No. 4338) ; Suiteiryō, (No. 1215).

Scirpus mucronatus LINN. ; FORBES et HEMSL. Ind. Fl. Sin. III. p. 252; MATSUM. et HAYATA Enum. Pl. Formos. p. 489.

HAB. Taitō, leg. T. KAWAKAMI et U. MORI, (No. 5734).

Scirpus ternatensis REINW. ; FORBES et HEMSL. Ind. Fl. Sin. III. p. 254 ; MATSUM. et HAYATA Enum. Pl. Formos. p.

HAB. G. NAKAHARA, (No. 970).

Scirpus triqueter LINN. FORBES et HEMSL. Ind. Fl. Sin. III. p. 255 ; MATSUM. et HAYATA Enum. Pl. Formos. p. 490.

The present plant is one of the most useful in Formosa. It is the principal source of the material of which the mats called " Taikō-mushiro " are made. The species exists spontaneously in Japan, but it does not there afford so good a material for mats, and therefore it is of no industrial interest. Consequently, the Formosan plant was regarded as quite distinct from the Japanese and, therefore different from *S. triqueter* LINN., which is widely dis-

tributed in the tropical and temperate regions of Eastern Asia. Some years ago, Mr. T. KAWAKAMI sent me a specimen of a sedge which is known as the best material for the Taikōmushiro, and is called by the name of Taikō-i (=Sedge of the Taikō-mat). Studying the specimen, I saw that the plant is quite the same as a Japanese sedge which is known to be identical with *S. triqueter* LINN., although there are some small differences between them in point of inflorescence. The differences are not, however, of such characters which botanically separate one from the other. While working here at Kew, I have compared the present sedge with numerous specimens of the named species preserved here, and found that there is a form of the species with which my plant is exactly identical. I have, therefore, no further hesitation in referring the present plant to *S. triqueter* LINN. It may be added, however, that the Formosan plant is not of the same form as the Japanese, or as the type of the species, but is of a form peculiar to itself and to a few specimens at Kew.

Remirea AUBL.

Remirea maritima AUBL.; BŒCK. in Linnæa XXXV. p. 435; C. B. CLARKE in HOOK. f. Fl. Brit. Ind. VI. p. 677; FORBES et HEMSL. Ind. Fl. Sin. III. p. 258;

HAB. Formosa.

DISTRIB. Kwangtung. On tropical sea-coasts throughout the world.

Cladium P. BR.

Cladium jamaicense CRANTZ.; FORBES et HEMSL. Ind. Fl. Sin. III. p. 262.

HAB. Hakuhakusha, leg. T. KAWAKAMI, 1906, Mai. (No. 1491).

DISTRIB. Kwangtung, Hongkong. From Sweden to the Cape of Good Hope; from Japan to Victoria, also throughout Polynesia ; but absent in India and West Malaya (after HEMSLEY).

Carex LINN.

Carex arenicola F. SCH.

HAB. in monte Morrison, leg. G. NAKAHARA, 1905.

The present specimen exactly accords with those so named in the Herbarium at Kew and also with those at Tōkyō. It would be very remarkable fact if this *Carex* should really exist in the mountains of Formosa. It may be doubted, however, if the specimen might not be one of the collections from Sachalin island, for the collector was sent to Formosa immediately after he had finished his work in Sachalin ; and it may be well conjectured that the present specimen, having escaped from the northern collections, was sent to me from the same collector then in Formosa.

Carex arisanensis HAYATA sp. nov. Culmi erecti graciles glabri basi foliis 4-5 confertis. Folia tenuia erecto-recurva basi plicata conferta vaginata, vaginis 2 cm. longis subhyalinis, ligulis brevissimis 1½ mm. longis obliquis ad basin laminarum sitis, laminis 15 cm. longis 4 mm. latis apice acuminato-obtusis utraque pagine et margine plus minus scaberulis subtus tenuiter distincte costatis inter catas et margines 3-nervatis. Spicæ paucissimæ brevissimæ 7 mm. longæ 1½-2 mm. latæ paucifloratæ, inferioribus longe pedunculatis, bracteis inferioribus longioribus basi vaginiformibus laminis linearibus spicas superantibus, pedunculis apice complanatis vel trigonis subalatis. Spicæ ♀ : triquetræ, squamis inferioribus plus minus majoribus ovatis 4 mm. longis 2 mm. latis apice rotundatis basi 1¼ mm. latis dorso costatis, (costis prope apicem abrupte evanescentibus), medio viridi-

bus margine non coloratis. Stamina erecta cum filamentis 5 mm. longa, filamentis validiusculis rectis 3 mm. longis, antheris exsertis lincaribus 2 mm. longis $\frac{1}{3}$ mm. latis apice obtuse bi-apiculatis basi leviter emarginatis vel rotundatis facie minute tenuiter striato-maculatis. Spicæ ♀: squamis rhachin semi-amplectantibus. Utriculus præmaturus cylindrico-lincaris $4\frac{1}{2}$ mm. longus, $\frac{1}{2}$ mm. latus vel angustior ore brevissime obtuso-2-dentatus 2-costatus glaber. Stylus basi non incrassatus 3-fidus.

Hab. Arizan, leg. T. Kawakami et U. Mori, Mart. 1908, (No. 3697).

Comes near *C. paucimascula* in having very short male spikes, but differs from it by scales, leaves, and nutlets.

Carex atronucula Hayata sp. nov. Culmi aphylli erecti 20-25 cm. alti graciles obtuso-trigoni basi squamati, (squamis imbricatis vaginiformibus, inferioribus brevioribus fuscentibus, superioribus longioribus, laminis lanceolatis $1\frac{1}{2}$ cm. longis apice obtusis), partibus squamatis circ. 2 cm. longis, a medio sursum spiciferi, partibus spiciferis 10 cm. longis obtuso-trigonis. Folia conferta linearia validiuscula subcoriacea 65 cm. longa culmos 3-plo in longitudine superantia suberecta 8 mm. lata apice acuminata plicato-nervosa utraque pagina margineque scabriuscula basi explicato-vaginiformia (partibus vaginiformibus 4 cm. longis apice vaginæ vestigiis ligularum), utraque pallida, basi fuscentia. Spicæ ♀: pedunculatæ racemose dispositæ, ad nodos solitariæ, vel geminæ, internodiis inferioribus 3 cm. longis; spicæ cylindricæ 2-$2\frac{1}{2}$ cm. longæ 4 mm. latæ, pedunculis 3 cm. longis, bracteis inferioribus majoribus, vaginiformibus, vaginis 8 mm. longis basi pubescentibus ore subtruncatis, laminis cuspidato-lanceolatis 12 mm. longis; squamis ovatis $2\frac{1}{2}$ mm. longis $1\frac{1}{4}$ mm. latis apice cuspidatis basi leviter contractis ad insertionem

1 mm. latis rotundatis dorso medio costatis, (cuspidibus margine minute aristato-hirtellatis). Utriculus ovoideo-fusiformis 2½ mm. longus 1 mm. latus vel angustior apice plus minus attenuatus basi acuto-obtusus, nuculam et partem basilarem styli includens trigonus, antice planus, postice elevato-convexus non costatus, latere costatus inter costas multinervosus, sub microscopio minute hirtellatus ore bidentatus. Achænia matura atro-fuscentia trigono-ovoidea, (angulis prominentibus sed obtusis), ecostata, 1⅓ mm. longa circ. 1 mm. lata apice cupulis annuliformibus coronata, partibus conico-incrassatis stylorum superata, basi intra squamas brevissime stipitata, (stipitibus ¼ mm. longis, flavis), facie superne inferne subexcavata a medio elevata, sub microscopio minute elevato-punctata; styli basin conico-incrassati supra partem conicum 3-fidi, ramis fuscentibus.

Hab. Randaizan, leg. T. Kawakami et U. Mori, 1908, Mart. (No. 3722).

Near *C. schistorhyncha*, *C. nexa*, and also *C. coreana* Kom. but differs from them by many points.

Carex bilateralis Hayata sp. nov. Culmi trigoni ad angulos acutos scabri facie striati minute longitudinaliter maculati 25-30 cm. alti basi vaginati, partibus foliatis 3 cm. longis, partibus floriferis 10 cm. longis. Folia linearia basi culmi conferta circ. 8 cm. longa basin 3½ mm. lata apice acuminata dorso medio costata margine plus minus recurva (supra costis impressis subtus elevatis), margine scabrida facie plus minus scabriuscula minute longitudinaliter maculata, vaginarum ore truncato, ligulis obsoletis vel brevissimis. Spicæ androgynæ racemosæ vel plus minus paniculatim dispositæ. Racemi 10 cm. longi 3 cm. lati, spicis ad nodos 2-3-4-fasciculatis, longe pedun-

culatis, bracteis inferioribus lanceolatis basi pedunculos vaginantibus, vaginis 7 mm. longis ore truncatis, laminis lineari-lanceolatis, bracteis superioribus vaginiformibus, laminis brevioribus gradatim obsoletis, spicis inferioribus cylindraceis 2 cm. longis vel brevioribus 5 mm. latis longe pedunculatis, pedunculis $3\frac{1}{2}$ cm. longis vel brevioribus scaberulis. Spicæ androgynæ ad apicem spiculis masculinis; spiculis ♂: squamis ovatis $3\frac{1}{2}$ mm. longis $1\frac{1}{2}$ mm. latis ad basin $\frac{2}{3}$ mm. latis apice acutis vel acuminatis glabris dorso costatis; spiculis ♀: squamis inferioribus longioribus plus minus obtusis oblongis $4\frac{1}{2}$ mm. longis $1\frac{1}{3}$ mm. latis apice interdum truncato-obtusis a basi $1\frac{1}{4}$ mm. latis a dorso tenuiter costatis medio non coloratis ad apicem et marginemque rubro-coloratis squamis superioribus plus minus acutis minoribus. Utriculus fusiformis a facie compressus 4 mm. longus 1 mm. latus apice bidentatus attenuatus basi acuto-attenuatus a latere costatus ad costis scabrido-hirsutus facie sursum hispidulus deorsum glaber. Achænia prænatura obovoidea a facie compressa 1 mm. lata apice truncato-rotundata basi acuto-obtusa glaberrima; styli 4 mm. longi basi erecti vix incrassati, vel non incrassati, a basi usque ad apicem 2-fidi, ramis fusco-rubescentibus hirtellatis.

Hab. in monte Morrison, leg. G. Nakahara, 1906.

Appears to be near *C. brunnea* Thunb., but differs from it in the shape of spikelets, utricles and nutlets.

Carex Boottiana Hook. et Arn. Bot. Beech. Voy. p. 273; Forbes et Hemsl. Ind. Fl. Sin. III. p. 275.

Hab. Kōtōshō, leg. T. Kawakami et U. Mori, 1908, Aprili. (No. 2421).

Distrib. Loo-choo, and Bonin Islands.

Carex chinensis Retz.; Boott Carex, p. 13, t. 36; Benth. Fl.

Hongk. p. 402 ; Boeck. in Linnæa XLI. p. 231 ; Forbes et Hemsl. Ind. Fl. Sin. III. p. 280.

Hab. Kelung, leg. T. Kawakami, 1907, Mart. (No. 4246); Fukkikaku, leg. T. Kawakami et Y. Shimada, 1908, Mart. (No. 4277).

Distrib. Fokien, Hupeh, Kwangtung, and Hongkong.

Carex Dunni Hayata sp. nov. Culmi 100 cm. alti vel altiores tereto-trigoni (angulis obtusissimis), basi foliis conferti, a medio 1-2-foliati. Folia linearia 60 cm. longa culmo breviora 9 mm. lata utraque pagine et margine scabrida facie plana subtus distincte tenuiter costata inter costam et marginem multinervata supra distincte 3-costata inter costas 7-8-nervata supra sursum scaberrima, suberecta basi vaginiformia plus minus fuscentia, vaginis 7-8 cm. longis ore obliquis, ligulis obliquis 1 mm. longis integris fuscentibus. Spicæ androgynæ vel fœmineæ a medio sursum culmorum paniculato-dispositæ, ramis panicularum erectis inferioribus longioribus 20 cm. longis ad nodos 2-3-fasciculatis, fasciculis inferioribus a se 17 cm. remotis, surperioribus minus remotis, ad nodos 1-foliatis, foliis ramos superantibus ; spicis versus apicem ramorum paniculatim vel racemosim vel spicatim dispositis ad basin ramulorum bracteatis, bracteis vaginiformibus acutis 4 mm. longis ; spicis subsessilibus vel pedunculatis, ad nodos ramulorum solitariis vel 2-3-fasciculatis obovato-cylindricis 2 cm.—$\frac{1}{2}$ cm. longis 2 mm. latis trigonis ; squamis inferioribus sterilibus, superioribus mediocribusque fœmineis, rarissime squamis superioribus 1-2 masculinis, vel sterilibus, sursum prope apicem squamis masculinis 3-4 fertilibus, prope basin squamis sterilibus. Fl. ♀ : squamis ovatis 5 mm. longis $2\frac{1}{2}$ mm. latis basi subvaginiformibus dorso costatis, costis ad apicem in aristam productis, margine eroso-integris ; antheris linearibus apice appendiculatis, (appendiculis

membranaceis hyalinis antheram in latitudine æquantibus brevissimis 2-3-serrato-denticulatis), basi minute auriculato-sagittatis. Fl. ♀: squamis late ovatis, cum cuspidibus 5 mm. longis 2 mm. latis a basi 1½ mm. latis plus minus rhachillam amplectantibus apice recto-acutis dorso versus apicem costatis (costis infra apicem in aristam 1 mm. longam productis), margine sursum eroso-integris aristis minute hirtellatis. Utriculus oblongo-ovatus 4¼ mm. longus 1½ mm. latus apice rostratus bidentatus basi obtusus bilateralis postice concavus antice convexus a latere costatus ad costis aristato-hirtellatus a facie plus minus minute pauceque hirtellatus. Achænium trigono-oblongum a dorso compressum postice leviter concavum vel planum antice elevato-angulatum, (angulis obtusis), fusco-rubescens basi brevissime stipitatum, stylo deorsum plus minus sensim incrassato minute hirtellato a medio sursum rubro-glanduloso-punctato a medio sursum 3-fido, ramis brevissime punctato-hirtellatis.

Hab. Giran, Kentōzan, leg. T. Kawakami et U. Mori, 1907, Juni. (No. 1350).

The present *Carex* comes near *C. Praini* and also *C. cryptostachys* Brongn., but differs from them in having much elongate flower-scales.

Carex fulvo-rubescens Hayata sp. nov. Culmi graciles glabri striati 34 cm. longi, partibus spiciferis 10 cm. longis, partibus foliatis 7 cm. longis. Folia basi vaginata, lamina linearia acuminata apice subteretia margine paullo revoluta circ. 10 cm. longa 3½ mm. lata utrinque glabra margine scaberula, vaginis hyalinis 3-fusco-nervatis, ore truncatis, ligulis brevissimis integris; bracteis fulvo-rubescentibus inferioribus vaginiformibus, cum vaginis 2 cm. longis, laminis lineari-lanceolatis 9 mm. longis, (ore fisso

ad basin laminarum obtuso-obsagittiforme producto), bracteis superioribus minoribus, laminis in setam brevissimam reductis. Spicæ ♂ solitariæ fulvo-rubescentes terminales cylindricæ 3½ cm. longæ 3½ mm. latæ pedunculatæ, pedunculis 1½ cm. longis, floribus ½-1 mm. a se remotis, squamis fulvo-rubescentibus obovato-oblongis valde imbricatis 5½ mm.-6 mm. longis 2 mm. latis apice rotundato-acutis vel brevissime aristatis basi cuneato-obtusis basi hyalinis, filamentis 5 mm. longis, antheris lincaribus breve apiculatis basi obtuse sagittatis 4 mm. longis. Spicæ ♀ fulvo-rubescentes laterales cylindricæ 2-3½ cm. longæ 4 mm. latæ 4-5 secus rhachin sitæ, 2 cm. a se remotis, pedunculis ½-1½ cm. longis, floribus densiuscule dispositis, inferioribus floribus 3 mm. a se remotis. Fl. ♀: squamis ovatis quam ♂ minoribus et angustioribus 3¼ mm. longis 1⅕ mm. latis acuminatis basi 1 mm. latis ad insertionem plus minus obliquis dorso apice plus minus carinato-aristatis. Utriculi linearifusiformes 5 mm. longi ½-⅔ mm. lati trigoni plus minus erecto-recurvi apice stylis erectis coronati, (stylis utriculum in longitudine æquantibus), apice 2-dentati a medio sursum rubro-colorati, facie plani dorso obtuso-angulati latere prominente costati ad costas hirsuti cæterum glabri, stipitibus infra utriculum plus minus productis. Achænia elongato-ovata 1½ mm. longa ½ mm. lata trigona 3-costata, (costis prominentibus), facie plana, dorso angulata glabra flava, stipitibus 1½ mm. longis erectis, stylis 6 mm. longis a basi plus minus incrassatis fuscentibus a medio sursum 3-fidis, ramis filiformibus hirsutis.

Hab. Taitō: Sumegan, leg. T. Kawakami et U. Mori, 1908, Jan. (No. 4563).

The present *Carex* appears to be near *C. manciformis* Franch. but differs from it in the shape of scales and utricles.

Carex Kawakamii Hayata sp. nov. Culmi ascendentes 7 cm. longi acuto-trigoni sub-alati ad angulos scabriusculi basi foliati. Folia tenuia erecto-recurvata sursum patentia 8-9 cm. longa culmos superantia 2-2½ mm. lata utraque pagine et ad costas marginemque glabra subtus distincte costata apice acuminata basi vaginiformia (vaginis demum explicatis 2 cm. longis prope marginem hyalinis). Spicæ pauci-floratæ 3-4 alternatim dispositæ, terminales ♂, reliquæ ♀, sub quoque spica unibracteatæ, bracteis inferioribus longioribus spicas 3-4-plo superantibus, spicis brevissime pedunculatis. Spicæ ♂: cylindricæ 1 cm. longæ 1 mm. latæ paucifloratæ; squamis oblongis 5 mm. longis 2 mm. latis apice acutis minutissime hirtellis a basi contractis ad insertionem 1 mm. latis dorso costatis. Spicæ ♀ spicis ♂ latiores paucifloratæ, squamis dimidium squamas ♂ æquantibus cuspidato-ovatis 2½ mm. longis 1¼ mm. latis dorso costatis costis apice in cuspidem productis glabris. Utriculus valde exsertus squamas circ. 2-plo in longitudine æquans ovoideo-fusiformis 5 mm. longus 1¾ mm. latus sub-trigonus antice elevato-convexus postice subplanus apice rostratus basi acutus apice 2-dentatus glaber non punctatus a latere tenuiter costatus inter costas 2-nervatus. Achænium obovoideum 1¾ mm. longum 1 mm. latum vel latius apice rotundatum basi acutum subtrigonum, (angulis obtusis), flavo-rubescens; stylus basi oblique erectus haud incrassatus supra medium 3-fidus, ramis reflexis hirtellatis.

Hab. in monte Morrison, (No. 2385).

Near *C. pseudo-japonica* Hayata, but differs from it in having nearly erect styles and not punctate utricles.

Carex ligata Boott var *γ* **formosensis** (Lév. et Van.) Kükenth. in Engl. Pfl.-reich IV.-20, Cyp.-Caricoid. p. 474.

Carex longispicata HAYATA sp. nov. Culmi 100 cm. alti vel altiores (basi foliis confertis instructi?) gracillimi acute triquetri glabri a facie striati ad angulos acuti vel sub alati facie $1\frac{1}{4}$ mm. lati. Folia caulina 50-60 cm. longa culmo breviora 4 mm. lata basi distincte tenuiter contracta, supra costis impressis, utraque latere castæ prominente 1 (?)-nervata, inter nervas multi-nervulosa utraque glabra. Spicæ ♂ terminales, androgynæ laterales, 4-5 racemosim alternatim dispositæ. Racemi 12 cm. longi, spicis ad nodos solitariis longe pedunculatis, bracteis longis spicas in longitudine superantibus, infimis longissimis 20 cm. longis 3 mm. latis basi brevissime vaginiformibus. Spicæ ♂ cylindricæ 4-5c m. longæ $1\frac{1}{2}$ mm. latæ pedunculatæ, pedunculis 1-3 cm. longis. Spicæ androgynæ, (partibus ♀ inferioribus partes superiores ♂ in longitudine 5-10-plo æquantibus, partibus masculinis interdum obsoletis), a se $1\frac{1}{2}$ cm.–$4\frac{1}{2}$ cm. remotæ, pedunculis 1-3 cm. longis. Fl. ♂ : squamis obovato-oblongis 3 mm. longis $1\frac{3}{4}$ mm. latis apice rotundato-truncatis ad summum extremitatem cuspidatis, (cuspidibus $\frac{1}{4}$ mm. longis), dorso costatis (costis apice in cuspides productis), longitudinaliter castaneo-striato-maculatis glabris. Fl. ♀ : squamæ quam iis ♂ breviores obovatæ cum cuspidibus $2\frac{1}{2}$ mm. longæ $1\frac{1}{4}$ mm. latæ sursum margine eroso-integræ dorso costatæ, (costis ad apicem in cuspidem 1 mm. longam productis), cuspidibus minute paucissime hirtellatis. Utriculus oblongus $2\frac{1}{3}$ mm. longus $1\frac{1}{3}$ mm. latus utraque acutus apice plus minus rostratus a dorso valde compressus facie leviter concavus dorso costato-convexus a latere costatus, (costis obtusis), rubescens minute muricatus dense punctatus. Achænium sub maturitate globosum $1\frac{1}{2}$ mm. in diametro a dorso compressum a latere costatum antice posticeque convexum glabrum fusco-rubescens basi plus minus brevissime stipitato-attenuatum ; stylo medio sensim paullo incrassato basi sensim paullo contracto, infra

medium reflexo tunc erecto supra medium 2-fido, ramis erectis hirtellatis.

Hab. Giran : Kentōzan, leg. T. Kawakami et U. Mori, 1906, Juni. (No. 1367).

Near *C. brunnea* Thunb., but differs from it in having much longer spikes and much compressed nutlets.

Carex morrisonicola Hayata sp. nov. *Carex* sp. Hayata Fl. Mont. Formos. p. 232. Culmi 6-8 cm. longi firmi scabridi apice 2-3 spicas gerentes. Folia 5-7 cm. longa 2 mm. lata culmo breviora firma subtus carinata glaucescentia apice sæpe circinnato-curvata basi vaginiformia, vaginis 15 mm. longis. Spicæ 2-3 ; terminalis masculina teres 7 mm. longa 1 mm. lata sæpe basi attenuata, squamis ovatis basi truncatis apice acutis 6 mm. longis, 2-3 mm. latis subtrinerviis, nervis castaneis ; reliquæ fœmineæ subsessiles pauciforæ 8-9 mm. longæ, squamis late ovatis acuminatis late 1-nerviis, nervo producto castaneo, partibus marginalibus hyalinis. Utriculus 2-costus ad costas minute denticulatus ovatus rostratus ore obscure bidentatus glaber. Achænium apice contractum triquetrum 3-costatum, styli basi conico-crassati. Stigma 3-fidum.

Hab. in monte Morrison, ad 13000 ped. alt. ; leg. T. Kawakami et U. Mori, Oct. 1906, (No. 2383).

The present *Carex* is very small in its habit and the floriferous culm has a very few spikes on its top. Short branches are sometimes seen at the basal portion of the culms.

Carex Nakaharai Hayata sp. nov. Culmi gracillimi circ. 50 cm. longi acute trigoni a facie 1 mm. lati ad angulos et faciem glabri basi foliis longe vaginatis 5-6, ad medium culmi 1-foliati, vel non-foliati, (partibus spiciferis circ 16 cm.

longis). Alabastrum ascendens multiseriatim squamatum, squamis inferioribus late ovatis, superioribus angustioribus, fusco-purpurascentibus. Folia linearia cum vaginis 35 cm. longa quam culmo breviora 3 mm. lata pallidiora, subtus leviter elevato-costata glabra supra et margine scabrida, supra obscure multinervata, costis non conspicuis, vaginis stramineis, ore oblique truncatis. Spicæ androgynæ tenuissimæ longe vel breve pedunculatæ, racemose vel paniculate dispositæ, gracillimæ, 1½ cm.-3 cm. longæ 1 mm. latæ vel angustiores erectæ, ad nodos 3-4-5-fasciculatæ, fasciculis inferioribus a se 5-10 cm. remotis, superioribus minus remotis, ad nodos 1-bracteatæ, bracteis inferioribus longioribus spicas valde superantibus basi vaginosis, superioribus brevioribus spicas in longitudine subæquantibus. Spicæ sursum ♂, deorsum ♀; partibus ♂ brevissimis 2-3 mm. longis, partibus ♀ longioribus, 1½-2 cm. longis. Fl. ♂: squamis basi valde amplexicaulibus circ. vaginosis, 2½ mm. longis, apice obtuso-acutis, non costatis, filamentis brevioribus, antheris linearibus 1½ mm. longis. Fl. ♀; floribus a se ⅔-½ mm. remotis, squamis late ovatis 2 mm. longis 1⅓ mm. latis, rhachillam amplectantibus. Utriculus bilateralis fusiformis 3 mm. longus 1 mm. latus vel angustior glaber utrinque attenuatus antice leviter convexus postice subconcavus latere tenuiter costatus apice bidentatus. Achænium bilaterale a dorso compressum fusco-rubescens obovato-oblongum vel oblongum 1½ mm. longum 1 mm. latum vel angustior apice rotundatum basi obtusum a latere albo-costatum glabrum postice subplanum, antice convexum, ad summum brevissime rostratum, (rostro cum stylo articulato), basi stipitatum, (stipite cum utriculo connato, infra achænium articulato); stylus basi constrictus supra basin sensim paullo incrassatus, supra medium 2-fidus.

Hab. Arizan, leg. G. Nakahara, 1906, Nov.

Near *C. brunnea* Thunb. and *C. longicruris* Nees, but differs from both in the shape of nutlets, and especially from the latter, in having utricles with entire margins and quite glabrous scales.

Carex orthostemon Hayata sp. nov. Culmi ascendentes vel decumbentes 13 cm. longi costato-striati basi foliati glabri apice spiciferi, partibus spiciferis 4-5 cm. longis. Folia linearia acuminata descendento-recurvata patentia, laminis 15 cm. longis culmos in longitudine superantia 4 mm. lata facie plus minus plicata margine integerrima utraque pagine scaberula subglabra subtus elevato-costata, ligulis brevissimis integris. Spicæ semper geminatæ, altera masculina, altera fœminea, geminis semper 2, altero terminali, altero laterali, bracteis secundatim dispositis a se 3-3½ cm. remotis paralleliter et simpliciter recurvatis apice descendentibus, inferioribus longioribus cum vaginis 10 cm. longis spicas valde excedentibus, basi vaginiformibus, vaginis 1 cm. longis ore truncatis, bracteis superioribus brevioribus. Spicæ masculinæ breve, fœmineæ longe, pedunculatæ; spicæ ♀ cylindricæ 1½ cm. longæ 1½ mm. latæ, spicas ♂ in longitudine 1⅔-plo superantes, pedunculis ½ cm. longis. Spicæ ♂: cylindricæ 1 cm. longæ, quam ♀ breviores, ¾ mm. latæ, floribus a se 1 mm. remotis, squamis arcte imbricatis vaginosis 3 mm. longis ½ mm. in sectione, ore obliquis eroso-integris apice rotundato-obtusis, dorso obscure costatis. Stamina 3, erecta cum filamentis 4 mm. longa, filamentis validiusculis 2 mm. longis complanatis 1-nerviis ⅕ mm. latis, antheris basifixis linearibus rectis filamentum in longitudine subæquantibus vel paullo brevioribus linearibus apice truncato-obtusis vel plus minus emarginatis

longe exsertis. Spicæ ♀ : cylindricæ, squamis late ovatis 3 mm. longis circ. 2 mm. latis apice aristato-cuspidatis sub cuspide emarginatis vel acutis basi 1¼ mm. latis rhachin involventibus, (cuspidibus ½ mm. longis margine minute aristato-serrulatis), dorso obscure costatis, (rhachillis subalatis, alis scabridis). Utriculus elongato-oblongus sub-bilateralis, plus minus trigonus facie subplanus dorso convexus latere costatus 3 mm. longus ⅔ mm. latus apice obscure 2-dentatus. Achænia præmatura cylindrica 1⅓ mm. longa apice leviter contracta ad stylorum basem incrassatam abeuntia. Styli basi incrassati validiusculi erecti, (partibus incrassatis 1½ mm. longis elongato-ovoideis minute glanduloso-cristato-punctatis), apice tri-fidi, ramis tenuibus 1½ mm. longis gracilibus minute papilloso-hirtellatis.

Hab. Arizan, leg. T. Kawakami et U. Mori, Mart. 1908, (No. 3603).

Near *C. tristachya* Thunb., but differs from it by the shape of the utricles and styles ; also near *C. brevicalmis*, from which this differs in many points.

Carex orthostemon Hayata var. **cupulifera** Hayata n. v. Ut typicæ. Achænia matura ovoidea vel oblonga glabra trigona 2¼ mm. longa 1¼ mm. lata 3-costata, (costis prominentibus), apice constricta, enfra basin stylorum cupulis coronata, obovata ; stylis basi conico-incrassatis, ad extremitatem constrictis, plus minus minuto tenuissime glanduloso-punctatis.

Hab. Randaizan, leg. B. Hayata et U. Mori, 1908, Aug. (No. 7061 et 7058) ; in monte Morrison, leg. T. Kawakami et U. Mori, (No. 1846).

It seems to me that the shape of the basal portion of styles are some times extremely variable, according to the stage

of development. The cups at the base of the styles are never seen in an earlier stage. The present variety differs from the type not only by the presence of the cups, but also by the less glandular base of the style.

Carex pseudo-filicina HAYATA sp. nov. Culmi trigoni graciles 40 cm. alti a basi ramosi vel eramosi subglabri, facie 1 mm. lati vel latiores, basi foliis confertis, (fasciculos foliorum basi squamatis, squamis atropurpureis ovatis elongato-ovatis apice obtusis). Folia culmo æquilonga 40 cm. longa 5 mm. lata tenuia membranacea plana suberecta subtus distincte tenuiter costata glabra, supra costis inconspicuis, multinervata plus minus scaberula apice acuminata basi vaginosa, vaginis 4-5 cm. longis tenuissime membranaceis purpureis, ligulis tenuibus 1 mm. longis oblique sitis. Paniculæ terminales vel laterales, 15 cm. longæ 4 cm. latæ, ramis inferioribus solitariis vel geminatis 10 cm. longis vel brevioribus ramulis sursum alternatim remote sitis 2 cm. longis, bracteis inferioribus longioribus quam ramo longioribus basi vaginosis, bracteis superioribus angustioribus, rarius filiformibus. Spicæ sessiles superiore simplices inferiore compositæ a se 3 mm.-5 mm. remotæ, generaliter 1 cm. longæ 1 mm. latæ a rhachi patentes, androgynæ, (superiore fl. masculinis, inferiore fœmineis), (partibus ♀ partes ♂ 3-5-plo in longitudine superantibus) circ. 1 cm. longæ vel longiores vel breviores, floribus a se ½ mm. remotis, rhachillis densiuscule hirsutis. Fl. ♂: squamæ ovato-lanceolatæ 2½ mm. longæ rubro-purpurascentes prope basin non coloratæ utraque glabræ margine integræ ciliolatæ vel haud ciliolatæ, antheris linearibus utrinque cellulis minutis clavatis coronatis. Fl. ♀: squamæ triangulares ovatæ 1-1½ mm. longæ ⅔ mm. latæ rubro-purpurascentes cuspidato-obtusæ vel

cuspidato-acutæ basi latissimæ, extus aristato-hirtellatæ. Utriculus trigono-ovoideo-fusiformis $2\frac{1}{2}$-3 mm. longus $\frac{3}{4}$ mm. latus apice rostratus (rostris 1-$1\frac{1}{2}$ mm. longis) basi obtusus glaber antice planus postice elevato-angulatus latere 2-costatus inter costas 4-6-nervatus flavescens versus rostrum fuscens. Achænium trigono-ovoideum glabrum castaneum 3-costatum, (angulis acutis), obtusum infra apicem valde constrictum supra constrictionem cum stylo articulatum basi plus minus in stipitem brevissimum productum, stylo basi gradatim incrassato supra basin 3-fido.

Hab. Arizan, leg. T. Kawakami et U. Mori, 1908, Mart. (No. 3707) ; Randaizan, (No. 7067).

Very near *C. cruciata* Wahl. and also *C. filicina*, but differs from the former in the shape of nutlets, and from the latter in having narrower bracts, much looser inflorescence and very much slender spikes.

Carex pseudo-japonica Hayata sp. nov. Culmi 10 cm. longi acuto-trigoni facie plus minus sulcati vel plani, partibus spiciferis 3 cm. longis, basi foliis confertis. Folia culmos 2-plo in longitudine superantia suberecta vel erecto-patentia cum vaginis 15 cm. longa 2-$2\frac{1}{2}$ mm. lata acuminata subtus elevato-costata utraque pagine et margine glabra. Spicæ ♂ terminales, ♀ laterales 3-4 alternatim dispositæ, ad nodos solitariæ a se 2-1 cm. remotis, subsessilia vel breve pedunculatæ, sub quoque 1-bracteatæ, bracteis inferioribus longioribus 6 cm. longis, basi brevissime vaginosis vel non vaginosis amplexicaulibus. Spicæ ♂ terminales cylindricæ, subsessiles 2-$2\frac{1}{2}$ cm. longæ 1-$1\frac{1}{2}$ mm. latæ, squamis dense adpresso-imbricatis oblongis $3\frac{1}{2}$ mm. longis $1\frac{1}{2}$ mm. latis apice rhomboideo-acutis basi plus minus angustatis ad insertionem $\frac{1}{2}$ mm. latis dorso obscure costatis apice aristato-acutis filamentis

a basi distinctis crispatis floribus a se $\frac{1}{2}$ mm. remotis. Spicæ ♀ laterales breve pedunculatæ vel superiore subsessiles cylindricæ $1\frac{1}{2}$-2 cm. longæ 3-4 mm. latæ dense floratæ, floribus a se $\frac{1}{3}$ mm. remotis, squamis $2\frac{1}{4}$ mm. longis 1 mm. latis ovatis apice cuspidatis basi plus minus contractis $\frac{2}{3}$ mm. latis ad insertionem sinuatis dorso obscure costatis. Utriculus ovato-fusiformis 3 mm. longus 1 mm. latus apice rostratus bidentatus basi breve attenuato-obtusus glaber minute-maculato-punctatus antice prominente convexus postice subplanus vel paullo convexus latere costatus. Achænia trigono-ovoidea, (angulis obtusis non costatis), plus minus obliqua apice obtusa basi acuta glabra rubescentia. Styli basi plus minus incrassati, (sed non conici), a basi reflexi supra basin recurvato-erecti basi flavescentes supra basin fusco-rubescentes supra medium 3-fidi, ramis filiformibus hirtellatis.

Hab. in monte Morrison, leg. T. Kawakami et U. Mori, 1906, Nov. (No. 2298).

Very near *C. japonica* Thunb., but differs from it by the nearly sessile spikes. There is a very similar specimen at Kew, collected by Dr. A. Henry, which is named *C. japonica* Thunb. by C. B. Clarke.

Carex reflexistyla Hayata sp. nov. Culmi circ. 30 cm. longi folio breviores, inferiore foliis cæspitosis, basi, squamis fusco-purpurascentibus 5-7 cm. longis involucrati, graciles triquetri ad angulos scabridi facie striati, partibus spiciferis 11 cm. longis. Folia basin culmi conferta basi erecta supra basin subito recurvato-patentia linearia 36-40 cm. longa culmos in longitudine superantia 6 mm. lata utrinque glabra subtus prominente costata arcte nervata, nervis inter costas et margines 7-8, ad costas et margines scabrida, basi fuscentia, vaginosa, vaginis circ. 5 cm.

longis erectis, partibus marginalibus hyalinis, ligulis brevissimis. Spicæ majores pauciores, terminales masculinæ, laterales androgynæ, ad nodos solitariæ; spicæ ♂ longe pedunculatæ cylindraceæ 3½ cm. longæ 7 mm. latæ. Spicæ androgynæ cylindricæ 4 cm. longæ, partibus superioribus masculinis angustioribus, inferioribus fœmineis partem masculinam 3-plo in longitudine superantibus 2½ cm. longis 9 mm. latis, bracteis inferioribus spicas longe superantibus 13 cm. longis, partibus vaginosis 2 cm. longis, basi fuscentibus. Fl. ♂: squamis elliptico-quadrangularibus 4½ mm. longis 2½ mm. latis apice longe cuspidatis, (cuspidibus 5½ mm. longis ⅓ mm. latis margine minute dentato-serrulatis), dorso trinervatis, nervis ad apicem cuspidis attingentibus, squamis superioribus angustioribus, filamentis elongatis filiformibus crispatis, antheris lincaribus 4 mm. longis apice acuto-apiculatis basi obtusis. Fl. ♀: squamis generaliter elliptico-quadrangularibus 5 mm. longis 2½ mm. latis apice longe cuspidatis, (cuspidibus 8 mm. longis margine minute dentato-serrulatis). Utriculus ovoideo-fusiformis apice rostratus 2-dentatus basi obtusus 6 mm. longus 2 mm. latus glaber apice ad marginem oris paucidentatus. Achænia matura rubra trigono-ovoidea, 2 mm. longa 1½ mm. lata, antice elevato-convexa postice subplana ad angulos costata ad costas medio acute emarginata, basi stipitata, stipitibus reflexis circ. 1 mm. longis; stylus basi duplicato-recurvatus a basi subito recurvus supra basin abrupte erecto-flexus medio rectus plus minus incrassatus, supra partem incrassatam 3-fidus, ramis filiformibus 6 mm. longis fusco-rubescentibus hirtellatis.

Hab. Kōtōshō, leg. T. Kawakami et U. Mori, 1907, Aprili. (No. 2421).

Near *C. longirostris* Boott, (*Carex* t. 73), but differs from it in having much larger spikes and reflexed stalks at the base of the nutlets.

Carex Sasakii Hayata sp. nov. Culmi altiores? sursum 1-2-foliati acute triquetri glabri ad angulos acuti vel subalati a facie 4 mm. lati. Folia versus apicem culmi linearia circ. 60 cm. longa culmos valde excedentia 1 cm. lata utraque glabra subtus distincte et tenuiter costata, supra costis impressis, utraque latere 1-nervata, inter costas nervos et margines multinervulosa, subtus pallidiora, basi breve vaginosa, vaginis 5-7 mm. longis ad nodos plus minus ventricosis obliquis, ligulis brevissimis obliquis. Racemi plus minus ramosi circ. 15 cm. longi, sub quoque ramo 1-bracteati, bracteis longissimis racemum valde superantibus, ramis inferiore cum rhachibus a basi usque ad supra medium connatis superiore liberis, spicis breve pedunculatis vel subsessilibus erecto-descendentibus. Spicæ terminales ♂ gracillimæ, cylindrico-filiformes, 6 cm. longæ 1½ mm.–2 mm. latæ, breve pedunculatæ; reliquæ androgynæ vel fœmineæ, validiusculæ, cylindricæ, 8 cm. longæ 6-7 mm. latæ floribus patentibus, partibus superioribus ♂ brevibus vel obsoletis, rarius ad utraque extremitatem ♂, medio ♀. Fl. ♂: squamæ elongato-oblongæ, vel oblongo-lanceolatæ. 4-5 mm. longæ 1 mm. latæ, dorso costatæ, apice in aristam productæ, (aristis 1½ mm. longis minute hirtellatis), arcte imbricatæ, filamentis tenuissimis crispatis albis, antheris linearibus 2⅓ mm. longis ¼ mm. latis rubescentibus apice apiculatis basi breve obtuso-sagittatis. Fl. ♀: squamæ elongato-ovatæ 3 mm. longæ acuminatæ 1¼ mm. latæ dorso costatæ, (costis viridibus ad apicem in acumen productis, acuminibus plus minus minute hirtellatis), margine integræ, basi contractæ ¼ mm. latæ. Utriculus pallidus, plus minus patens, antice recurvus ovoideus, 3¼ mm. longus 1 mm. latus vel latior, apice rostratus, (rostris brevibus leviter recurvatis), basi obtusus, latere costatus, glaber apice breve bidentatus. Achænium triquetro-ovoideum oblongum vel obovoideum utrinque acutum,

antice planum, postice angulato-elevatum, 1½ mm. longum 1 mm. latum, flavescens glabrum, stylo haud incrassato, postice reflexo, a medio 3-fido, ramis fusco-rubescentibus minute hirtellatis.

HAB. Nantō : Musha, leg. T. KAWAKAMI et U. MORI, 1908, Mart. (No. 3749).

Near *C. kiyotensis* CLARKE and also *C. nemostachys* STEUD., but differs from both in the shape of nutlets.

Carex Shimadai HAYATA sp. nov. Culmi 70-80 cm. alti, folium excedentes, gracillimi basi foliis confertis, supra basin usque ad apicem non foliati, triquetri, a facie ⅔ mm. lati. Folia angustissima, linearia 60 cm. longa 3 mm. lata, plicato-teretia, recto-recurvata, sub recta, subtus obscure costata, costis inconspicuis, supra multinervata, ad nervos et margines scaberula, basi vaginosa, vaginis 6-25 cm. longis in longitudine mutabilibus, ligulis circ. obsoletis. Spicæ racemose 3-4-dispositæ, racemis 25 cm. longis, spicis ad nodos solitariis longe vel breve pedunculatis a se 5-8 cm. remotis ad nodos 1-bracteatis, bracteis longe vaginosis, vaginis 2-3½ cm. longis ore obliquis, laminis cuspidatis 1 cm. longis vel superiore obsoletis. Spicæ ♂ terminales longe cylindricæ, 9 cm. longæ 3 mm. latæ. Spicæ ♀ laterales cylindricæ 5 cm. longæ, pedunculis 3-6 cm. longis. Fl. ♂ : squamæ oblongo-angustatæ 7 mm. longæ, 2¼ mm. latæ, apice acutæ basi sensim angustatæ basi ¾ mm. latæ, castaneo-fuscentes, dorso medio costatæ, costis planis flavescentibus prope apicem evanescentibus. Fl. ♀ : squamæ late ovatæ squamis ♂ multo breviores, 4 mm. longæ 3 mm. latæ apice brevissime cuspidatæ castaneo-fuscentes, ad basin et marginem non coloratæ, haud costatæ. Utriculus oblongo-lanceolatus 5½ mm. longus, 1⅓ mm. latus apice attenuatus

suberectus 2-dentatus basi plus minus breve stipitatus postice planus antice convexus latere costatus, ad costas hirtellatus, facie glaber multinervulosus. Achænium sub maturitate castaneum, trigonum 3-costatum, (præmaturum elongato-obovoideum 2 mm. longum 1 mm. latum apice rotundatum) abrupte in apiculum brevissimum truncatum productum, cum stylo articulatum, basi angustatum in stipitem 1 mm. longum productum, glabrum flavescens antice anguloso-convexum postice planum, stylo basi plus minus sensim incrassato supra basi 3-fido, ramis fusco-rubescentibus filiformibus hirtellatis.

Hab. Tōyen: Bakei, leg. T. Kawakami et U. Mori, 1907, Mart. (No. 2699).

Near *C. foraminata* Clarke, but differs from it in having glabrous beaked utricles; also near *C. Morrowii*, from which this is distinguishable by the very slender leaves and many other points.

Carex Shimadai Hayata var. **longibracteata** Hayata. n. v. Culmi 40-50 alti erecti gracillimi triquetri a facie $\frac{3}{4}$ mm. lati glabri, partibus spiciferis 10 cm. longis. Folia ut typicæ. Spicæ terminales ♂, typicis angustiores 7 cm. longæ $2\frac{1}{2}$ mm. latæ, bracteis typicis longioribus. Fl. ♂: squamæ rhombeo-lanceolatæ 6 mm. longæ 2 mm. latæ apice cuneato-acuminatæ basi angustatæ castaneo-fuscentes basi et margine hyalinæ medio vix costatæ, costis flavescentibus prope apicem evanescentibus. Fl. ♀: squamæ late ovato-quinquangulares, $3\frac{1}{2}$ mm. longæ 2 mm. latæ apice acuto-cuspidatæ basi $1\frac{1}{3}$ mm. latæ margine minutissime ciliolatæ castaneo-fuscentes, dorso medio basi arcolis cuspidiformibus instructæ, (arcolis basi $1\frac{1}{3}$ mm. latis sursum subito attenuatis prope apicem squamæ evanescentibus). Utriculus ut typicæ. Achænium

maturum trigono-fusiforme apice truncatum vel cupulis parvulis coronatum basi attenuatum in stipitem 1 mm. longum productum glabrum flavescens, stylo basi plus minus conico-incrassato, (interdum partibus conicis inconspicuis) supra basin 3-fido.

HAB. Shinkō : Rahoo, leg. T. KAWAKAMI et U. MORI, 1908, Feb. (No. 5086).

The present variety differs from the type in having much longer bracts, acuter scales of male and female flowers and in the shape of the nutlets ; but in other respects they are very similar. Further study will prove that the variety is a mere form of the type.

Carex sociata BOOTT Carex IV. p. 200; FORBES et HEMSL. Ind. Fl. Sin. III. p. 311.

HAB. Kwashōtō, leg. T. KAWAKAMI et G. NAKAHARA, Feb. 1906, (No. 1024); Tōyen, Goryō, leg. T. KAWAKAMI et U. MORI, 1907, Mart. (No. 2671).

DISTRIB. Loo-choo islands.

Carex transalpina HAYATA sp. nov. Rhizoma ? Folia fasciculorum 20-30 cm. longa 2 mm. lata culmo florigero paullo breviora basi vaginata, vaginis 2-3 cm. longis, oribus truncatis, supra et margine scabrida. Culmi florigeri graciles 30 cm. longi 3-4 foliati, foliis superioribus basi vaginatis, laminis spica æquilongis. Spicæ 3-4 remote dispositæ ; terminalis masculina elongata pedunculata 3 cm. longa 2 mm. lata, squamis obovatis vel late cuneatis marginatis, marginibus badio-fuscis ; reliquæ fœmineæ elongatæ 2 cm. longæ spica masculina latiores breve pedunculatæ erectæ, floribus remotis, squamis ovatis marginatis acutis basi truncatis. Utriculus 2-carinatus multinervius pubescens compressus apice rostratus distincte 2-dentatus, stigma 3-fidum. Achænium

trigonum 3-costatum glabrum apice leviter in collum brevissimum coronatum.

Hab. in monte Morrison, ad 9000 ped. alt., leg. T. Kawakami et U. Mori, Oct. 1906, (No. 2380).

I am informed by the Rev. Kuekenthal that this *Carex* have some resemblance to *C. Makinœnsis* Franch.

Gramineæ.

Paspalum Linn.

Paspalum conjugatum Berg.; Trin. Sp. Gram. Icon. t. 102; Kunth Enum. (1833) I. p. 51; Hook. f. Fl. Brit. Ind. VII. p. 11; Rendle in Forbes et Hemsl. Ind. Fl. Sin. III. p. 319.

Hab. Bonin, leg. T. Kawakami, Aug. 1907.

Distrib. Widely spreads in the tropics, probably a native of the New World.

Eriochloa H. B. et K.

Eriochloa polystachya H. B. et K.; Forbes et Hemsl. Ind. Fl. Sin. III. p. 320; Matsum. et Hayata Enum. Pl. Formos. p. 498.

Hab. Taitō, Mabukutsu, leg. T. Kawakami, 1907, Aug. (No. 5611).

Distrib. Tropics of the Old World and Brazil.

Isachne R. Br.

Isachne debilis Rendle in Forbes et Hemsl. Ind. Fl. Sin. III. p. 322.

Hab.

Distrib. An endemic plant.

Panicum Linn.

Panicum brevifolium Linn. ; Forbes et Hemsl. Ind. Fl. Sin. III. p. 328 ; Matsum. et Hayata, Enum. Pl. Formos. p. 501.

Hab. Taitō, Makwa, leg. T. Kawakami, 1906, (No. 1457).

Panicum barbivaginale Hayata sp. nov. Culmi basi procumbentes sursum erecti 20 cm. alti teretes striati 1 mm. lati tota longitudine foliosi, (foliis alternatis a se 1½ cm. remotis), glabri. Folia basi vaginosa, laminis cordatis 1½ cm. longis 12 mm. latis acutis basi cordatis, costis inconspicuis, circ. 10-nervatis, inter nervos 3-nervulatis, utrinque glabris, margine a medio deorsum ciliatis basi culmos perfecte amplectantibus, a culmo angulo 90° divaricatis, vaginis 5 mm. longis cylindricis intus glabris extus dense barbatis, (barbis 2 mm. longis), ab ore usque ad basin fissis, margine (altero ciliatis, altero haud ciliatis) ore ad insertionem laminarum ciliato-barbato. Paniculæ terminales elongato-ovatæ pedunculatæ vel sessiles 4 cm. longæ 2 cm. latæ, ramis rectis patentibus, mediocribus longioribus 2 cm. longis recto-ascendentibus, spiculis secus rhachin ramulorum distichiter descendenter dispositis. Spiculæ ovoideæ, 1 mm. longæ pedicellatæ, pedicellis ½-2 mm. longis gracilibus glabris apice infra articulationem incrassatis gluma subæquilongis. Gl. I. glabra obovata 1 mm. longa apice obtusa vel rotundata basi ¼ mm. lata 1-nervata decidua ; gl. II. gluma I. conformis longior 1⅕ mm. longa acuta 1-nervata glabra decidua ; gl. III. ovata triangulari-obtusa circ. 1 mm. longa gl. II. brevior extus hirsuta, (pilis recurvis patentibus), margine vix ciliata ; gl. IV. gluma III. conformis, sed prope marginem vix hirsuta, margine haud ciliata. Achænia tereti-oblonga plus minus

obliqua, $\frac{2}{3}$ mm. longa $\frac{3}{8}$ mm. lata rubro-purpurascentia glumis III. et IV. persistentibus inclusa.

Hab. Tōyen, leg. T. Kawakami et Y. Shimada, 1907, Oct. (No. 5681).

Panicum paspaloides Hayata sp. nov. Culmi basi repentes prostrati ad nodos radicantes (internodiis 7-8 cm. longis), sursum ascendentes ad nodos foliati ramuliferi supra spicigeri ad totam longitudinem glabri tereto-tetragoni, partibus ascendentibus 40-50 cm. longis, basi 2 mm. in sectione, sursum graciles $\frac{3}{4}$ mm. in sectione. Folia ad nodos alternatim disposita a se 8 cm. remota, cum vaginis circ. 19 cm. longa, laminis angustatis lanceolatis 15 cm. longis 1 cm. latis apice acuminatis membranaceo-coriaceis basi leviter contractis supra parcissime hirsutis vel subglabris, subtus glabris vel subglabris, ad marginem scabridis, prope basin longe ciliatis, vaginis 4 mm. longis explicato 8 mm. latis ab ore usque ad basin fissis margine altero sursum ciliatis altero non ciliatis integris, ligulis ciliiformibus, ciliis dense sitis 1 mm. longis, vaginis intus glabris extus prope medium hirsutis prope margines glabris, alabastrum foliorum includentibus. Paniculæ 10 cm. longæ 6 cm. latæ, ramis simplicibus spiciformibus patentibus alternatis a se 1-3 cm. remotis, (utraque latere rhachis 2), spicis sessilibus 5-4 cm. longis 2 mm. latis, spiculis secus rhachin unilateraliter subdistichiter dispositis, rhachibus spicarum a dorso complanatis 1 mm. latis, postice (supra) convexis, antice (subtus) prominente costatis secus costis spiculas alternatas gerentibus, (spiculis a se 1-2 mm. remotis a latere approximatis), rhachibus ad latus et costam subalatis, ad marginem alarum brevissime dentato-ciliolatis. Spiculæ oblongo-obovoideæ a dorso complanatæ 4 mm. longæ $1\frac{1}{2}$ mm. latæ apice acutæ basi angustatæ, ad basin

⅔ mm. latæ. Gl. I. a facie posteriore spiculæ sita, latissime globosa 2 mm. longa 3 mm. lata apice obtusa basi leviter contracta 1½ mm. lata 10-nervata hyalina basin spiculæ involvens ; gl. II. a facie anteriore sita oblongo-obovata 4 mm. longa 2⅓ mm. lata glumam I. 2-plo superans apice acuta basi contracta a basi 1 mm. lata 7-nervata sursum viride colorata ad marginem plicata spiculam plus minus involvens ; gl. III. gluma II. conformis, sed vix minor 3½ mm. longa ad marginem sursum plus minus plicata 5-nervata glabra paleam hyalinam 2 mm. longam includens ; gluma terminalis oblonga 3 mm. longa 1½ mm. lata concava margine plus minus recurvata indurata, nervis inconspicuis ; palea gluma terminali conformis 2½ mm. longa apice rotundata concava margine recurvata.

Hab. Garanbi, leg. T. Kawakami, 1904, Oct.

Panicum prostratum Lam. ; Forbes. et Hemsl. Ind. Fl. Sin. III. p. 332 ; Matsum. et Hayata Enum. Pl. Formos. p. 505.

Hab. Takaw, leg. G. Nakahara, 1905 ; T. Kawakami, 1907, Juli. (No. 5011).

Panicum sarmentosum Roxb. ; Forbes. et Hemsl. Ind. Fl. Sin. III. p. 333 ; Hayata in Tōkyō Bot. Mag. XXI. p. 52.

Hab. Takaw, leg. G. Nakahara, Sept. 1905, (No. 643).

Panicum? semialatum Kth. in Herb. Kew.

Hab. Randaizan, leg. T. Kawakami, 1908, (No. 7055).

Compared with a specimen so named at Kew.

Panicum submontanum Hayata sp. nov. Culmi ultra 60 cm. longi 2 mm. lati ramosi foliosi tereto-tetragoni a latere plus minus sulcati glaberrimi plus minus flexuosi (internodiis 6 cm. longis). Folia radicalia ignota. Folia caulina lanceolata membranacea, laminis lanceolatis 21 cm. longis 12 mm. latis acu-

minatis basin valde contractis 1 mm. latis supra tenuiter brevissime pubescentibus subtus brevissime villoso-pubescentibus medio distincte costatis margine scaberrimis, vaginis 5 cm. longis 4 mm. latis margine plus minus ciliolatis, ore dentato-ciliato, intus glabris extus pubescentibus. Paniculæ terminales 14 cm. longæ 2 cm. latæ, ramis inferioribus longioribus 6½ cm. longis oppositis vel alternis a se circ. 2 cm. remotis gracilibus ramulosis, ramulis 3 cm. longis gracilibus ramulosis. Rhaches panicularum teretes pubescentes. Spiculæ ad apicem ramulorum apicalium geminatim sitæ pedicellatæ, pedicello altero longiore 2 mm. longo, altero breviore 1 mm. longo, apice cum spiculis articulatis, spiculis obovoideis 2 mm. longis ⅔ mm. latis. Glumæ demum minus arcte imbricatæ; gl. I. ovata 1½ mm. longa 1 mm. lata utrinque obtusa 3-nervata margine paucissime ciliata; gl. II. ovata 1⅔ mm. longa 1½ mm. lata spiculam amplectans, obtuso-acuta basi contracta ½ mm. lata margine ciliata 5-nervata; gl. III. 1½ mm. longa, paleam sterilem amplectans; gl. IV. ovata 1⅓ mm. longa, paleam fertilem amplectans.

Hab. Taitō: Harōye, leg. T. Kawakami et Z. Kobayashi, 1907, Oct. (No. 6019).

Panicum trypheron Schult.; Hook. f. Fl. Brit. Ind. VII. p. 47; Forbes et Hemsl. Ind. Fl. Sin. III. p. 333.

Hab. Pachina, 1896.

Distrib. China, India, Malaya, Tropical Africa.

Arundinella Raddi.

Arundinella hispida Hack. var. **humilis** (ex Herb. Faurei).

Distrib. Formosa, leg. U. Faurie.

Thuarea PERS.

Thuarea sarmentosa PERS. ; FORBES et HEMSL. Ind. Fl. Sin. III. p. 340 ; HAYATA in Tōkyō Bot. Mag. XXI. p. 50.

DISTRIB. Hongkong, Ceylon, Cochinchina, Malaya, North Australia, Pacific Islands.

Perotis AIT.

Perotis latifolia AIT. ; FORBES et HEMSL. Ind. Fl. Sin. III. p. 343 ; MATSUM. et HAYATA Enum. Pl. Formos. p. 516.

HAB. Takaw, leg. G. NAKAHARA, Sept. 1905, (No. 646).

Miscanthus ANDERSS.

Miscanthus transmorrisonensis HAYATA sp. nov. Culmi ultra 60 cm. longi tota longitudine foliati teretes glabri sursum fusco-colorati. Folia radicalia ignota, caulina linearia cum vaginis circ. 35 cm. longa suberecta, laminis subplicatis 28 mm. longis 5 mm. latis, supra glabris plano- et lato-costatis, subtus elevato-costatis subglabris margine scaberrimis basi plus minus constrictis prope basi longe barbatis, barbis 6 mm. longis, (ligulis 1 mm. longis 4 mm. latis membranaceis), vaginis 6 cm. longis explicato 8 mm. latis margine sursum ciliato-barbatis intus glabris nitidis extus glabris sursum parcissime pubescentibus. Paniculæ obovatæ 18 cm. longæ 8 cm. latæ, ramis subsimplicibus spiciformibus, spicis 5-10 cm. longis subsessilibus vel breve pedunculatis, inferiore ad nodos 2-3-fasciculatis, (internodiis 1-3 cm. longis), superiore solitariis. Rhaches panicularum semiteretes vel trigonæ fuscentes

rhachibus spicarum gracilibus $\frac{1}{4}$ mm. latis subtriquetris ad angulos scabridis; spiculis geminatis, (altero breve pedicellato, pedicello 1 mm. longo basi barbato, barbis $1\frac{1}{4}$ mm. longis, altero longe pedicellato, pedicello 3 mm. longo scaberulo) geminis a se 4 mm. remotis; spiculis oblongo-cylindricis $3\frac{1}{4}$ mm. longis 1 mm. latis apice attenuatis basi obtusis barbatis, barbis rubris 3-4-mm. longis. Gl. I. oblonga $3\frac{1}{2}$ mm. longa 1 mm. lata 3-nervata apice plus minus bi-dentata vel integra margine sursum ciliolata deorsum integra; gl. II. oblongo-obovata 3 mm. longa $1\frac{1}{2}$ mm. lata apice plicato-cuspidato-acuta margine sursum longe ciliata deorsum non ciliata prope apicem plus minus purpurascens; gl. III. hyalina oblonga $2\frac{1}{2}$ mm. longa 1 mm. lata margine sursum leviter plicata ciliata; gl. IV. hyalina ovata $2\frac{1}{2}$ mm. longa $\frac{2}{3}$ mm. lata apice acuminata ad aristam 7 mm. longam abeuns margine ciliata 1-nervata, aristis basi rubescentibus.

Hab. Randaizan, leg. B. Hayata et U. Mori, (Nos. 1826 et 7065).

Near *M. sinensis* var. *formosanus* Hack., but differs from it in having nearly glabrous sheath of the leaves and much less branched panicles.

Saccharum Linn.

Saccharum Narenga Ham., Forbes et Hemsl. Ind. Fl. Sin. III. p. 349; Matsum. et Hayata Enum. Pl. Formos. p. 519.

Hab. Nantō: Horisha, leg. T. Kawakami et U. Mori, 1906, Nov. (No. 2379).

Spodiopogon TRIN.

Spodiopogon formosanus RENDLE ! in FORBES et HEMSL. Ind. Fl. Sin. III. p. 351.

HAB. Taitō : Daironkōsha, leg. T. KAWAKAMI et U. MORI, 1906, Nov. (No. 2366).

Eremochloa BUSE.

Eremochloa ophiuroides HACK.; FORBES et HEMSL. Ind. Fl. Sin. III. p. 363 ; HAYATA in Tōkyō Bot. Mag. XXI. p. 50.

HAB. Biyōritsu, leg. T. KAWAKAMI, (No. 7157).

Erianthus MICH.

Erianthus pollinioides RENDLE ! in FORBES et HEMSL. Ind. Fl. Sin. III. p. 350 ; MATSUM. et HAYATA Enum. Pl. Formos. p. 520.

HAB. Daikanaihō, leg. Y. SHIMADA, 1904, (No. 152).

Alopecurus LINN.

Alopecurus agrestis LINN. ; BENTH. Fl. Hongk. p. 407 ; HOOK. f. Fl. Brit. Ind. VII. p. 239 ; FORBES et HEMSL. Ind. Fl. Sin. III. p. 385 ; HAYATA in Tōkyō Bot. Mag. XXI. p. 55.

Agrostis LINN.

Agrostis alba LINN. ; HOOK. f. Fl. Brit. Ind. VII. p. 254 ; FORBES et HEMSL. Ind. Fl. Sin. III. p. 389.

Hab. Randaizan, (No. 7068).

Distrib. Japan, Himalaya, Central Asia, Europe.

Agrostis perennans Tuck.; Miq. in Ann. Mus. Bot. Lugd. Bat. II. p. 277 ; Franch. et Savat. Enum. Pl. Jap. p. 166 ; Forbes et Hemsl. Ind. Fl. Sin. III. p. 390.

Hab. Randaizan, leg. T. Kawakami, (No. 7054).

Distrib. Japan, China, Corea, eastern United States.

Chloris Swartz.

Chloris barbata Sw. ; Forbes et Hemsl. Ind. Fl. Sin. III. p. 403 ; Matsum. et Hayata Enum. Pl. Formos. p. 537.

Hab. Takaw, leg. G. Nakahara, (No. 635).

Chloris incompleta Roth. ; Forbes et Hemsl. Ind. Fl. Sin. III. p. 404 ; Matsum. et Hayata Enum. Pl. Formos. p. 538.

Hab. Banchōryō : Shinyishi, leg. G. Nakahara, Oct. 1905, (No. 600).

Phragmites Trin.

Phragmites communis Trin. ; Forbes et Hemsl. Ind. Fl. Sin. III. p. 409 ; Matsum. et Hayata Enum. Pl. Formos. p.

Hab. Shintiku, leg. Y. Shimada, (No. 5760).

Eragrostis Beauv.

Eragrostis elongata Jacq. ; Forbes et Hemsl. Ind. Fl. Sin. III. p. 413 ; Matsum. et Hayata Enum. Pl. Formos. p. 542.

Hab. Taitō, Saikōwa, leg. T. Kawakami, (No. 478).

Eragrostis formosana HAYATA in Tōkyō Bot. Mag. XXI. p. 53.

HAB. Nankokei, leg. G. NAKAHARA, (No. 208).

Eragrostis major HOST ; FORBES et HEMSL. Ind. Fl. Sin. III. p. 416 ; MATSUM. et HAYATA Enum. Pl. Formos. p. 543.

HAB. Taitō : Hakuhakusha, leg. T. KAWAKAMI, (No. 1479).

Festuca LINN.

Festuca ovina LINN. var. **vulgaris** KOCH. form. **purpurascens.** Folia validiora, arcuata, latiora, breviora, 7 cm. longa ; glumæ plus minus purpurascentes.

HAB. in monte Morrison.

Lepturus R. BR.

Lepturus repens R. BR. ; FORBES et HEMSL. Ind. Fl. Sin. III. p. 433 ; MATSUM. et HAYATA Enum. Pl. Formos. p. 548.

HAB. Shohobo, leg. G. NAKAHARA, Oct. 1906, (No. 628) ; Pratas, leg. T. KAWAKAMI, 1908, Juni.

Arundinaria MICHX.

Arundinaria naibunensis HAYATA sp. nov. Culmi ignoti. Rami ut videntur graciles, subteretes a facie ramificationum obscure plano-sulcati, in speciminibus nostris 3 mm. in diametro, (internodiis 10 cm. longis), ad nodos plus minus tumidi duplicato-annulati, (annulis a se 2 mm. remotis, annulis inferioribus distinctis superioribus obscuris), supra nodos plus minus tumidi, ramulis ad nodos fasciculatis gracilibus basi perulatis, perulis triangularibus vel lanceolato-triangularibus 4 mm.–2 cm. longis. Folia lanceolata 8 cm. longa 19 mm. lata apice acuminata basi obtusa ad extremitatem breve attenuata, (partibus attenuatis

$1\frac{1}{2}$ mm. longis 1 mm. latis), utraque pagine scaberula margine scabrida, subtus subglauca distincte costata inter costas et margines 3-nervata inter nervos tenuissime 6-nervulosa, supra minute nervulosa costis et nervis inconspicuis, vaginis 6 cm. longis cylindraceis, ab ore usque ad basin fissis explicato 6 mm. latis intus nitidis extus glabris multo et prominente nervatis ad orem barbatis, barbis 3 mm. longis, ligulis barbiformibus. Spiculæ simplices remote floratæ a latere compressæ 1-6-floratæ elongato-oblongæ $2\frac{1}{2}$ cm. longæ 4 mm. latæ interdum breviores pedicellatæ ad nodos ramulorum 3-4-fasciculatæ, uno pedicellorum longissimo, reliquis brevioribus, gracillimis crispatis ascendentibus rarius pendulis. Gl. I. et II. vacuæ ovatæ vel elongato-oblongæ 5 mm.-10 mm. longæ 2 mm. latæ stramineæ, floribus 3-6, a se 2 mm. remotis, rhachillis flexuosis complanatis glabris; fl. gl. oblonga 12 mm. longa explicato 5 mm. lata 9-nervata, (nervis viridibus), margine integra plus minus ciliolata apice acuta basi palcam amplectans; palea elongato-oblonga 11 mm. longa explicato 5 mm. lata apice truncata dentata medio 2-nervata, (nervis a se $1\frac{2}{3}$ mm. remotis), margine secus nervos plicata, inter nervos 4-nervulata, inter nervos et margines 2-nervulata, margine hyalina, tenuissima non ciliata, basi genitalia amplectans; lodiculæ 3, 2-majoribus ovatis apice obtusis $1\frac{1}{2}$ mm. longis 1 mm. latis basi $\frac{1}{2}$ mm. latis margine ciliolatis hyalinis, 1-minore. Stamina 3, antheris linearibus 8 mm. longis $\frac{8}{10}$ mm. latis apice obsagittatis, lobis acutis, basi 2-lobatis, lobis obtusis $1\frac{1}{3}$ mm. longis. Ovarium ovoideum $\frac{2}{3}$ mm. longum leviter compressum, stylo a basi 2-fido, ramis sursum plumosis.

Hab. Kōshūn: Naibun, leg. G. Nakahara, 1907, Feb.

A very distinct species of the genus. I have not seen any specimen like this at Kew.

Cryptogamiæ.

Selaginellaceæ.

Selaginella SPRING.

Selaginella atroviridis SPRING ; MATSUM. et HAYATA Enum. Pl. Formos. p. 552.

HAB. Randaizan, leg. B. HAYATA et U. MORI, 1908, Aug. (No. 7083) ; Suichōriu, leg. C. OWATARI.

Selaginella caulescens SPRING ; MATSUM. et HAYATA Enum. Pl. Formos. p. 552.

HAB. Suichōrū, leg. C. OWATARI.

Selaginella flabellata SPRING ; MATSUM. et HAYATA Enum. Pl. Formos. p. 553.

HAB. in monte Taichū, leg. Y. TASHIRO, (A. 27) ; Pachina, leg. S. NAGASAWA.

Selaginella leptophylla BAKER ; MATSUM. et HAYATA Enum. Pl. Formos. p. 553.

HAB. Shinkō, leg. T. KAWAKAMI.

Selaginella morrisonensis HAYATA sp. nov. Caulis basi procumbens sursum ascendens 10-15 cm. longus, foliis dorsiventraliter dispositis, glaber subteres, ramis et ramulis alternatim patentibus. Folia 4-seriatim dorsiventraliter disposita, dorsalia (caulis) alterna sessilia ovata 2 mm. longa 1 mm. lata ad insertionem 1-2 mm. a se remota apice cuspidata basi leviter cordata plus minus obliqua, latere exteriore angustata,

margine integra, sursum paucissime mucronato-ciliolata, latere interiore latiora margine mucronato-vel aristato-ciliolata ; folia dorsalia (ramuli) minora cum cuspidibus 1 mm. longa, apice longe aristato-cuspidata, cæterum ut folii caulini ; folia ventralia (caulis) alternatim disposita, folium dorsalem in longitudine $\frac{2}{3}$-plo æquantia, elliptico-ovata, 3 mm. longa, $1\frac{2}{3}$ mm. lata, obscure costata, apice obtusa basi plus minus cordata, margine minute brevissime aristato-ciliolata, latere exteriore angustiora basi cordata, latere interiore latiora basi rotundata ; folia ventralia (ramuli) iis caulis conformia sed minora $1\frac{1}{2}$ mm. longa. Spicæ 1-2-3 mm. longæ, tetragonæ, $1\frac{1}{5}$ mm. latæ, bracteis dorsalibus viridibus cuspidato-triangularibus $1\frac{1}{4}$ mm. longis $\frac{2}{3}$ mm. latis apice cuspidatis plus minus interiore recurvis basi cordatis margine aristato-ciliolatis, basi obliquis latere interiore latioribus viridibus, latere exteriore hyalinis non coloratis, medio prominente carinatis, bracteis ventralibus iis dorsalibus conformibus sed non coloratis, macrosporangium amplectantibus. Microsporæ globosæ apice plus minus pyramidales, papilloso-tuberculatæ rubescentes. Macrosporæ flavescentes globosæ apice plus minus pyramidales papilloso-tuberculatæ.

Hab. Ganzan, leg. S. Nagasawa, 1905, Oct. (No. 685).

Lycopodiaceæ.

Lycopodium Linn.

Lycopodium tereticaule Hayata sp. nov. Caulis pendulus 20-25 cm. longus teres cum foliis cylindricus $3\frac{1}{2}$ mm. latus dichotome ramosus, ad totam longitudinem foliosus, glaber, inter folia plus minus sulcatus. Folia spiraliter 1-2 seriatim dispodita crassiuscula $1\frac{1}{2}$ mm. longa cuspidiformia angustata $1\frac{1}{2}$ mm. longa,

a basi latissima $\frac{1}{2}$ mm. lata apice obtusa a basi ascendentia sursum interiore recurva a se 1 mm. remota. Sporophyllæ non visæ.

HAB. Goshizan, leg. T. KAWAKAMI et U. MORI, 1906, Juni. (No. 1407).

There is nothing like this at Kew. I think this must be a species not yet described.

Lycopodium formosanum W. HERTER in Herb. Kew.

I have seen a specimen of this species at Kew. It is not yet represented at Tōkyō.

Lycopodium Phlegmaria LINN.; BAKER Fern-Allies p. 22.

Lycopodium filiforme HAYATA in MATSUM. et HAYATA Enum. Pl. Formos p. 555, (non ROXB.)

Lycopodium verticillatum var. *filiforme* HAYATA in MATSUM. et. HAYATA Enum. Pl. Formos. p. 555, (non SW.)

HAB. Kōshūn, leg. T. KAWAKAMI.

Lycopodium pinifolium BLUME ; BAKER Fern-Allies p. 21.

HAB. Botanrosha, leg. G. NAKAHARA, 1906.

DISTRIB. Java, Borneo, and New Guinea.

Lycopodium taxifolium SW.; BAKER Fern-Allies p. 16.

HAB. Formosa.

DISTRIB. Tropical America.

Lycopodium subdistichun MAKINO in Tōkyō Bot. Mag. XII. p. 37 ; MATSUM. et HAYATA Enum. Pl. Formos. p. 556.

HAB. Manchōsha, leg. G. NAKAHARA, (No. 787).

DISTRIB. Southern parts of Japan.

Ophioglossaceæ.

Botrychium Sw.

Botrychium ternatum Sw.; Hayata in Tōkyō Bot. Mag. XXIII p. 2.

Distrib. Japan and Himalaya.

Polypodiaceæ.

Acrophorus Presl.

Acrophorus stipellatus (Wall.) Moore; Hayata in Tōkyō Bot. Mag. XXIII. p. 4.

Hab. Randaizan, leg. B. Hayata et U. Mori, 1908 Aug.

Distrib. Monotypic genus. India, Malaya.

Observ. Stipites 45 cm. longi, 5 mm. in diametro, stramineo-rubescentes, basi dense, sursum parce, squamati, cæterum glabri, subnitentes, cicatricibus V-formibus squamarun notati, basi teretes medio semiteretes, squamis inferioribus triangulari-ovatis, a basi latissimis 1-2 cm. longis, tenuissimis hyalinis. Frondes late triangulares stipitem in longitudine paullo superantes, 55 cm. longæ, 60 cm. latæ, apice acutæ basi truncatæ, pinnis infimis longissimis, partibus infimis quadripinnatis, inferioribus tripinnatis, superioribus bipinnatis, sursum simpliciter pinnatis, pinnis oppositis utraque latere circ. 18, inferiore circ. 11 cm. a se remotis, sessilibus transverse divaricatis, plus minus ascendento-arcuatis, pinnis infimis ovato-triangularibus apice acuminatis basi obtusis 35 cm. longis, 23 cm. latis, latere inferiore quam latere superiore latioribus, pinnulis utraque latere 18 inferiore 4 cm. a se remotis, pinnulis I.

infimis brevioribus, inferioribus longissimis 14 cm. longis 6 cm. latis, pinnulis II. angustatis, inferiore 3 cm. longis 13 mm. latis obtusis, pinnulis III. utraque latere 8 inferiore 5 mm. a se remotis obovatis vel elongato-quadrangularibus 8 mm. longis 4¼ mm. latis apice truncatis basi cuneato-acutis obliquis latere superiore latioribus dentato-incisis, dentibus obtusis ascendentibus utraque latere 4, (pinnulis III. prope apicem pinnularum II. obovatis subintegris). Rhaches frondium glabræ, semiteretes, supra sursum tenuissime sulcatæ ad nodos pubescentes, subtus convexæ ad nodos haud pubescentes; rhaches pinnarum semiteretes supra sulcatæ subglabræ, vel basi parcissime pubescentes; rhaches pinnularum I. subsimiles, plus minus pubescentes; rhaches pinnularum II. supra sulcatæ, plus minus pubescentes subalatæ; paginæ herbaceæ membranaceæ, exsiccato fusco-rubescentes, supra parce pilis erecto-patentibus dispersæ, subtus subglabræ, ad venas et venulas parcissime pilis brevissime dispersæ; venis flexuosis, venulis plus minus ramosis interdum apice furcatis, ramis liberis apice plus minus oblongo-incrassatis, partibus incrassatis utraque, præsertim supra, elevatis, prope marginem evanescentibus, venulis ultra receptaculum leviter productis, partibus productis ¼ mm. longis clavatis ecoloratis, venulis a ramificatione usque ad insertionem receptaculorum distincte fuscentibus elevatis. Sori prope apicem venularum dorsaliter siti, subglobosi, ½ mm. in diametro a margine ½-1 mm. remoti. Indusium globosum valde concavum subcupuli forme ad insertionem truncatum plus minus contractum a pagina pinnularum transverse patens, margine inflexum erosum.

The present form is a little different from that of the type.

Dryopteris Adanson.

Dryopteris anastomosans Hayata sp. nov. Stipes ? Frondes

rhomboideo-triangulares, 60 cm. longæ, totiusque latæ, inferiore bipinnatæ, superiore pinnatæ, pinnis infimis longissimis 40 cm. longis, a rhachibus angulo 50° divergentibus, elongato-triangularibus, vel angustato-lanceolatis, basi latissimis 21 cm. latis, sursum pinnatifidis, deorsum pinnatis, pinnulis lanceolatis 14 cm. longis 2 cm. latis sursum acuminatis apice obtusis a se 4 cm. remotis margine lobulatis, pinnulis versus apicem pinnarum gradatim in lobos abeuntibus; pinnis superioribus pinnatifidis, apice in pinnam lobulatam abeuntibus; pinnulis pinnarum inferiorum margine lobulatis, sursum subintegris lineari-acuminatis, basi latere superiore acutis, latere inferiore decurrentibus, lobulis obtusis triangularibus, a costis 4 mm. remotis (i.e. a sinibus inter lobulos usque ad costas 4 mm.); rhaches frondium circ. semiteretes, supra profunde 3-sulcatæ minute muricato-pubescentes, vel subglabræ, subtus convexæ, haud sulcatæ, stramineo-rubescentes; rhaches pinnarum et venis pinnularum minute pubescentes; paginæ glabræ, membranaceæ, ad marginem nervo marginatæ subtus pallidiora, supra glabræ ad soros prominente elevatæ venis anastomosantibus, areolis copiosis, venulis liberis 2-3. Sori ad totam paginam dispersi depresso-globosi, 2 mm. in diametro, ad apicem venularum liberarum terminales. Indusium orbiculare, cordatum.

Hab. Randaizan, leg. T. Kawakami et U. Mori, Aug. 1908, (No. 7136).

Near *D. giganteum*, but differs from it in the shape of the pinnæ. It should better be referred to *Aspidium* on account of its having anastomosing veins (see p. 449).

Dryopteris Beddomei (Bak.) O. Ktze.; Hayata in Tōkyō Bot. Mag. XXIII. p. 4.

Distrib. South China, India, South Ceylon, Philippines.

Dryopteris brunnea C. CHRISTENSEN ; HAYATA in Tōkyō Bot. Mag. XXIII. p. 4.

Dryopteris Clarkei (BAKER) O. KTZE ; C. CHRISTENSEN Ind. Fil. p. 258.

Nephrodium Clarkei BAKER.

HAB. in monte Morrison, 10000 ped. alt., leg. T. KAWAKAMI, (No. 1824).

DISTRIB. Sikkim.

Dryopteris dissecta (DESV.) O. KTZE. ; C. CHRISTENSEN, Ind. Fil. p. 262.

HAB. Murimuribussha, leg. K. MIYAKE, 1899 ; Kako, leg. G. NAKAHARA, (No. 221).

DISTRIB. North India, Malaisia, Polynesia, Madagascar.

Dryopteris distans (METT.)

HAB. Botansha, (No. 895).

Dryopteris Filix-mas var. **serrato-dentata** BEDD.

HAB. in monte Morrison, 12000 ped. alt., (No. 2503).

Dryopteris formosana (CHRIST) C. CHRISTENSEN Ind. Fil. p. 266.

Dryopteris Kawakamii HAYATA sp. nov. Stipites erecti 14 cm. longi, dorso (supra) 3-sulcati, stramineo-rubescentes, squamati, (squamis copiosis imbricatis in magnitudine variabilibus linearicuspidatis acuminatis fusco-stramineis 8-9 mm. longis 1 mm. latis, interdum basi cordatis), etiamque pilis crispatis dense obtecti. Frondes lanceolatæ in ambitu, 50 cm. longæ, 15 cm. latæ, apice acuminatæ basi obtusæ, bipinnatæ, pinnis lateralibus angusto-lanceolatis sessilibus, superioribus a rhachibus angulo 90° patentibus,

inferioribus et infimis reflexis, pinnis infra medium frondis longissimis 10 cm. longis 2 cm. latis apice acuminato-linearibus a medio usque ad basin æquilatis, pinnis infimis brevissimis reflexis angulo 150° a rhachibus patentibus 2½ cm. longis 1 cm. latis, pinnis utraque latere frondium 30, a se 1-1½ cm. remotis; rhaches supra sulcatæ pilosæ squamatæ, rhachillæ supra sulcatæ dense rubro-hirsutæ subtus paucissime pilosæ, squamis lanceolatis 1-2 mm. longis basi ventricosis instructis; pinnulæ ad medium pinnarum late lineares 1 cm. longæ 3 mm. latæ sessiles æquilatæ, obtuse dentatæ, (dentibus utraque latere 3-4-5 plus minus ascendentibus vel transversis obscuris), supra densiuscule subtus parcissime strigoso-pilosæ, (pilis rigidis crispatis 1 mm. longis), margine plus minus revolutæ, (venulis liberis), sub quoque dente 1-soriferæ, rarius 2-soriferæ. Sori depresso-orbiculares, 1 mm. in diametro, receptaculis a margine ½ mm. remotis, indusiis generaliter obsoletis rarius late orbicularibus cordatis.

Hab. Randaisan, leg. U. Mori, 1908, Aug. (No. 7134).

Near *D. Filix-mas* Schott, but differs from it in the position of sori which are very near the margin.

Dryopteris lasiocarpa Hayata sp. nov. Stipites glabri stramineo-flavescentes, 15 cm. longi, supra profunde 1-sulcati, subtus convexi, 6 mm. lati. Frondes herbaceæ, hirsutæ, ovatæ, 67 cm. longæ 35 cm. latæ, apice caudato-acuminatæ basi obtusæ, bipinnatæ, pinnis pinnatis a medio deorsum æquilongis 23 cm. longis ovato-acuminatis patentibus a rhachibus angulo 70 divaricatis, pinnis a medio sursum gradatim brevioribus in pinnas pinnatifidas vel lobulatas abeuntibus; pinna terminali caudato-acuminato; pinnis inferioribus lanceolato-ovato-acuminatis 23 cm. longis 8 cm. latis suboppositis a se 6-7 cm. remotis pinnatis,

pinnulis lanceolatis, pinnulo infra medium longissimo 5 cm. longo sessili acuminato pinnatifido ; segmentis a rhache $\frac{1}{2}$ mm. remotis (i.e. a sinibus inter dentes usque ad costas $\frac{1}{2}$ mm.) angustatis 9 mm. longis $3\frac{1}{2}$ mm. latis obtusis dentatis, (dentibus acutis ascendentibus), sursum pinnularum acuminatis, acuminibus obtusis basi dentatis prope apicem integris. Rhaches frondium subtereto-complanatæ, supra 2-sulcatæ, inter sulcos elevatæ, dense hirsutæ, stramineo-flavescentes, subtus glabræ ; rhaches pinnarum complanatæ, leviter 2-sulcatæ, medio dense hirsutæ, sursum partibus decurrentibus pinnularum alatæ, supra brevissime parcissime aristato-strigosæ, subtus glabræ ; pagnæ supra ad venas nervosque pubescentes, subglabræ, subtus pilosæ, pilis patentibus 1 mm. longis, venis et venulis omnibus liberis. Sori ad lobos pinnularum secus venas utraque latere intra venas et margines 4-3, ad venulas dorsales suborbiculares $\frac{2}{3}$ mm. in diametro. Indusium late cordatum, margine longe ciliatum.

HAB. Kōtōshō, leg. G. NAKAHARA, Feb. 1906, (No. 994).

Dryopteris (*Aspidium*) **leucostipes** (BAKER) C. CHRISTENSEN Ind. Fil. p. 274 ; CHRIST in Bull. Herb. Boiss. II.-4, (1904), p. 615.

HAB. in sylvis Kelung, leg. U. FAURIE, 1903.

DISTRIB. An endemic plant.

Dryopteris subexaltata C. CHRISTENSEN Ind. Fil. p. 295.

OBSERV. Stipites cæspitosi, 20 cm. longi, graciles medio 1 mm. lati, ad basin dense squamati, (squamis stramineo-rubescentibus lineari-lanceolatis 8 mm. longis), supra subglabri vel parcissime squamati, basi rubro-purpureo-fuscentes, a medio sursum straminei, plus minus complanati, supra sulcati, subtus convexi, plus minus purpurascentes. Frondes

herbaceo-membranaceæ ovatæ 20 cm. longæ, 13 cm. latæ, remote bi-pinnatæ, sed sursum simpliciter pinnatæ, pinnis utraque latere 11 subrectis plus minus ascendento-recurvatis a rhachibus frondium angulo 60° divaricatis, petiolatis, (petiolis $\frac{1}{2}$-1 cm. longis); pinnis inferioribus rectis ascendentibus longissimis 11 cm. longis a se 4 cm. remotis ovatis 4 cm. latis apice acuminatis (acuminibus linearibus serratis) remote pinnatis, pinnulis inferioribus obtuse lanceolatis 2 cm. longis 1 cm. latis apice obtusis vel acutis basi cuneatis inferioribus a se 1 cm. remotis margine dentato-lobatis, (lobis utraque latere 4 elongato quadrangularibus apice truncatis margine plus minus obscure aristato-serrulatis vel integris); rhaches frondium complanatæ supra et latere sulcatæ, subtus convexæ; rhaches pinnarum subalatæ; venulis apice furcatis, ramulis prope marginem evanescentibus apice plus minus clavatis. Sori sub quoque lobo pinnularum prope costas generaliter 1, vel ad lobos inferioribus 2-3, ad ramulos superiores venularum furcatarum dorsales, (novelli indusiis subhypogynis perfecte inclusi). Indusium unilateraliter apertieus, reniforme-cordatum $\frac{3}{4}$ mm. latum, $\frac{2}{3}$ mm. longum. Indusium ante apertiens sacciforme, reniforme, depressum, supra minute et brevissime glanduloso-hirtellum (pilis glandulosis brevissimis globulis capitatis), subtus nudum, sorum perfecte includens.

Hab. Nagotake, Liukiu, leg. S. Tanaka et Y. Tashiro, (No. 201); Haneshiyama, leg. G. Nakahara.

Distrib. Formosa.

The indusium of the present fern is, when opened, reniformed or slightly cordate. It is attached at the end of the cordate notch, to the axis of the receptacle on a branch of a veinlet. It reminds me of the sori of *Dryopteris Maximowiczii* O. Ktze. The indusium is, before opening, like a cushion-formed sac which

completely includes a sorus in itself. It is densely covered with very short glandulous hairs on the upper side of the outer surface, but it is quite hairless on the lower side of the same surface. It is quite hairless inside. It should be referred to a special section together with *Dryopteris Maximowiczii* which has a very peculiar sorus different from that of other species of the genus. My thanks are due to Mr. S. KODAMA who has kindly examined the plant at my request.

Dryopteris rufinervis HAYATA sp. nov. Stipites? Frondes ovato-lanceolata ut videntur verisimiliter ultra 150 cm. longæ 80 cm. latæ bipinnatæ, (sed pinnis infimis cum una pinnula pinnata) ; pinnis inferioribus lanceolatis in ambitu, subsessilibus, 45 cm. longis, 23 cm. latis a basi 18 cm. latis, apice acuminatis, utraque latere pinnulis 15-16, a se 3-4 cm. remotis, pinnulis mediocribus angustato-lanceolatis 12 cm. longis 3 cm. latis apice cuspidato-acuminatis, (cuspidibus linearibus), basi circ. æquilatis pinnatifidis (lobis elliptico-angustatis a medio usque ad basin æquilongis 1 cm. longis 7 mm. latis ascendento-patentibus apice obtusis basi æquilatis, margine crenato serratis, serris obtusis, sinibus inter lobos angustis obtusis 2 mm. latis apice a rhachibus 3 mm. remotis) ; partibus apicalium pinnularum et pinnarum margine lobulatis, sursum serratis ; pinnis infimis oblique triangularibus in ambitu 45 cm. longis 30 cm. latis basi latere superiore 10 cm. latis, latere inferiore 25 cm. latis, pinnulis latere superiore 15-17, latere inferiore paucioribus 13-15, pinnulis infimis (latere superiore) a rhachibus frondium 3 cm. remotis, iis mediocribus conformibus æquilongis ; pinnulis (latere inferiore) iis latere superiore generaliter longioribus, ias in longitudine $2\frac{1}{2}$-plo æquantibus, præsertim pinnulo infimo longissimo a rhachibus frondium 8 cm. remoto 25 cm. longo 12 cm. lato pinnato, pinnulis

angustato-lanceolatis. Rhaches frondium semiteretes 4-5 mm. latæ supra concavæ vel medio sulcato-elevatæ, muricato-pubescentes, subtus convexæ, subglabræ, vel plus minus muricatæ; rhaches pinnarum tereto-complanatæ, 2½ mm. latæ, supra 3-sulcatæ, straminco-fuscentes, brevissime pubescentes subtus subglabræ convexæ, costæ pinnularum supra elevatæ subplanæ subtus planæ sed distincte rufo-coloratæ; venis et venulis supra plus minus elevatis subtus planis sed distinctis parcissime minute squamatis; areolis costalibus latissime triangularibus 7 mm. longis 1 mm. latis. Sori prope marginem 1-seriatim dispositi, a margine 1 mm. remoti, depresso-globosi 1 mm. in diametro. Indusium cordatum.

Hab. Chiōran, leg. G. Nakahara, Aug. 1905, (No. 274).

Near *Nephrodium Leuzeanum*, Hk. but differs from it in the shape of the fronds. It should better be referred to *Aspidium*, on account of its having anastomosing veins (see p. 449).

Dryopteris todagensis Christ. ? Hayata in Tōkyō Bot. Mag. XXIII. p. 25.

Dryopteris parasitica O. Ktze ? Hayata in Tōkyō Bot. Mag. XXIII. p. 25.

Dryopteris (§ *Phegopteris*) **remota** Hayata sp. nov. Stipites tenues 18 cm. longi 1 mm. in diametro glabri, nitentes subteretes supra profunde sulcati straminei. Frondes stipite breviores, ambitu triangulares apice acuminatæ basi latissimæ 12 cm. longæ a basi 16 cm. latæ apice pinnatæ medio bipinnatæ infime tripinnatæ pinnis remotissime oppositis, a rhachibus angulo 70 divaricatis, inferioribus 3 cm. a se remotis, infimis longissimis a basi sursum gradatim brevioribus; pinnis infimis elongato-triangularibus 8 cm. longis a basi 3½ cm. latis petiolatis, (petiolis 13 mm. longis),

obliquis, latere inferiore quam latere superiore latioribus, pinnulis l. inferioribus pinnatis a se circ. 1 cm. remotis superioribus pinnatifidis versus summum lobulatis, pinnulis l. infimis latere inferiore pinnarum 23 mm. longis 1 cm. latis sessilibus basi pinnatis medio pinnatifidis sursum lobulatis, (segmentis infimis angustato-quadrangularibus 6 mm. longis $1\frac{1}{5}$ mm. latis apice obtusis basi plus minus contractis vel ad rhachin adnatis divaricatis margine undulato-integris, undis utraque latere 3-4. Rhaches frondium semiteretes glabræ tenuissimæ supra sulcatæ subtus convexæ ; rhaches pinnarum supra leviter sulcatæ glabræ ; venis centralibus segmentorum infimorum, et venulis flexuosis, venulis simplicibus ad sinus undorum attingentibus, utrinque planis, sed distinctis, glabris ; paginæ membranaceæ, utraque glabræ. Sori globosi circ. $\frac{3}{4}$ mm. in diametro ad quoque venulas dorsaliter siti utraque latere venarum 1-seriatim 3-4 dispositi : receptaculum prope apicem venularum lineare. Indusium non visum, verisimiliter obsoletum.

HAB. in monte Morrison, leg. G. NAKAHARA, 1905, Oct.

Near. *Nephrodium Dryopteris* but differs from it in the arrangement of the pinnæ.

Dryopteris (*Nephrodium*) **sparsa** O. KTZE ; C. CHRISTENSEN Ind. Fil. p. 273.

Nephrodium sparsum DON.

HAB. Tamsui, HANCOCK. in Herb. Kew.

DISTRIB. South China, India, North Ceylon, Malesia, Mauritius.

Dryopteris spinulosa O. KTZE var. **morrisonensis** HAYATA n. v. Stipites 13 cm. longi straminei basi fuscentes basi dilatati 4 mm. lati sursum 1 mm. lati squamis inferioribus latissimis tenuibus rubescentibus subhyalinis ovato-lanceolatis 1 cm. longis 4 mm. latis apice acuminatis basi truncatis vel rotundatis minute elevato-

reticulatis margine subintegris intus saccato-concavis, superioribus minoribus paucis. Frondes ovatæ vel elongato-ovatæ herbaceo-membranaceæ 17 cm. longæ 11 cm. latæ apice acutæ basi obtusæ bipinnatæ, partibus infimis subtripinnatis ; pinnis infimis longissimis 6 cm. longis 4 cm. latis oblique triangularibus, latere inferiore latiore 2½ cm. lato infima latere superiore angustiore 1½ cm. lato, pinnula superiore (latere superiore) a rhachibus frondium 2 mm. remota, pinnula infima inferiore (latere inferiore) a rhachibus frondium 7 mm. remota ; pinnis mediocribus angustatis 4½ cm. longis basi 2 cm. latis a basi sursum gradatim angustioribus, apice obtusis pinnatis, pinnulis elongato-quadrangularibus inferioribus 1 cm. longis 5 mm. latis a basi latissimis ima basi contractis, subsessilibus margine inciso-dentatis, (dentibus utraque latere 4-5, ascendentibus quadrangularibus, apice acutis paucissime serratis serris utraque latere dentium 1-2, acutis) ; pinnis generaliter a rhachibus frondium angulo 70° divaricatis, rectis vel plus minus recurvis. Rhaches frondium supra tenuissime 2-sulcatæ vel 1-sulcatæ inferiore 1½ mm. latæ squamatæ, superiore nudæ subcomplanatæ, subtus convexæ glabræ nudæ ; rhaches pinnarum et pinnularum sulcatæ, squamatæ vel subnudæ vel nudæ glabræ complanatæ ; paginæ utraque glabræ, venis et venulis simplicibus liberis. Sori ad basin quoque dentium 1, globosi 1 mm. in diametro latere ramorum superiorum venularum furcatarum dispositi. Indusium cordatum margine brevissime eroso-denticulato-ciliolatum.

Hab. in monte Morrison, ad 12000 ped. alt., leg. T. Kawakami et U. Mori, 1906, Oct. (No. 2500).

Very near *Nephrodium dilatatum* and also *N. Copelandi* Christ., but differs from both by the lobes of the pinnæ.

Dryopteris Yabei HAYATA sp. nov. Stipites rubescentes 30 cm. longi basi squamati. (squamis linearibus nigricantibus 1-1½ cm. longis vel brevioribus rubescentibus), supra bisulcati, basi 4 mm. lati ad totam longitudinem parcissime muricati. Frons ovata in circumscriptione 45 cm. longa 30 cm. lata apice cuspidata basi obtusa, subglabra coriacea bipinnata, partibus infimis rarius subtripinnatis, pinnis mediocribus angustato-lanceolatis 15 cm. longis basi latissimis 5 cm. latis apice acuminatis plus minus petiolatis, pinnis infimis conformibus longioribus latissimis, pinnis utraque latere frondis 15-16 inferioribus 5 cm. a se remotis, pinnis basi pinnatis sursum pinnatifidis, (segmentis falcato-recurvis apice acutis mediocribus 1½ cm. longis 4 mm. latis a basi contractis vel plus minus dilatatis margine obscure dentatis vel distincte dentatis) ; pagina supra viridis subtus pallidissime plus minus rubescens, utraque glabra. Rhachis frondis supra bi-tri-sulcata, piloso-squamata, squamis densiusculis rubris, subtus convexa, minute parcissime muricata ; rhachis pinnarum complanata, supra plano-sulcata glabra subtus elevata squamata, venis et venulis liberis. Sori secus venas loborum pinnarum vel pinnularum sub quoque dente siti, a apice dentium 2 mm. remotis, vel sursum ad sinus dentium siti. Indusium persistens orbiculari-cordatum 1½ mm. in diametro rubrum margine paucissime eroso-ciliolatum.

HAB. Kushaku et Shintengai, leg. K. MIYAKE, 1899.

Near *Nephrodium acutum* HOOK., but differs from it by the shape of the lowest pinna.

Aspidium SWARTZ.

Aspidium hokutense HAYATA sp. nov. Rhizoma repens squamatum, squamis fuscente-nigricantibus dense obtectum. Stipites

stramineo-rufescentes 30 cm. longi, basi fuscentes parce squamati, (squamis rubro-nigricantibus lanceolatis acuminatis 2-3-4 mm. longis 1-½ mm. latis), a basi usque ad medium purpurascentes sursum subglabri basi anguloso-teretes 1½-2 mm. in diametro, supra 1-2-sulcati subtus convexi. Frondes profunde-cordatæ in ambitu, 20 cm. longæ totiusque latæ, trifoliolatæ, tenuissime membranaceæ, subglabræ, foliolo terminali hastato 3-lobato apice acuto basi truncato, 16 cm. longo, 13 cm. lato, petiolato 4 cm. longo ; lobo terminali elongato-triangulari apice acuto basi latissimo 13 cm. longo, 7 cm. lato, margine sursum undulato, deorsum grosse dentato, (dentibus obtusis, ascendento-triangularibus 1 cm. longis totiusque latis), lobis lateralibus lobum terminalem in longitudine ½-plo æquantibus elongato-triangularibus 7 cm. longis 2½ cm. latis sursum acuminatis apice obtusis, basi latissimis margine subintegris apice sursum ascendento-recurvatis ; foliolo terminali pinninervio, venis basilaribus (=nervis loborum lateralium) oppositis 11 cm. longis, a costa angulo 60° divaricatis, venis primariis lateralibus lobi terminalis utraque latere 16, inferioribus 4-5 cm. longis, a se 1½ cm. remotis, recto-ascendentibus, ad apicem dentium attingentibus, a costa angulo 50° divergentibus ; foliolis lateralibus oblique hastatis, (breve petiolulatis, petiolulis 5 mm. longis, a rhachibus frondium angulo 60° divaricatis), 14 cm. longis 10 cm. latis, apice acuminatis, basi cordato-truncatis, inæqualiter tri-lobatis, lobo terminali elongato-triangulari 12 cm. longo 4 cm. lato a medio usque ad basin æquilato, sursum sensim angustato, acuminato, apice obtuso, ascendento-recurvato, margine subintegro, sed latere inferiore deorsum irregulariter grosse obscureque dentato vel repandato, lobo laterali latere superiore minore obscuro inconspicuo brevissimo obtuso vel circ. obsoleto, lobo laterali latere inferiore majore

conspicuo ovato-triangulari 6 cm. longo $2\frac{1}{2}$ cm. lato sursum acuminato apice obtuso basi latissimo sursum ascendento-recurvato a lobo terminali angulo 90° divaricato margine integro ; nervis venisque ut lobi terminalis ; rhaches frondium tetragono-teretes, supra sulcatæ latere planæ subtus convexæ parcissime pubescentes ; costæ foliolorum supra planis dense brevissime hirsutæ subtus parcissime minute piloso-squamatæ minute parce maculatæ, venis et venulis utraque plus minus elevatis distinctis, venulis inter venas reticulatis areolis venulis liberis plus minus ramosis. Sori marginales 1-2-3-seriatim dispositi, ad venulas liberarum dorsales, globosi 1 mm. in diametro. Indusium profunde cordatum 1 mm. in diametro, margine longe ciliolatum.

HAB. Hokuto, leg. G. NAKAHARA, Dec. 1906.

Very near *A. trifoliatum*, but differs from it in the position of sori which are nearly limited towards the margin.

Aspidium melanocaulon BLUME ; C. CHRISTENSEN Ind. Fil. p. 82. *Nephrodium melanocaulon* BAKER.

HAB. Liukiu, Hanechiyama, leg. G. NAKAHARA, Aprili.

DISTRIB. South China, Tonkin, Malesia, Philippines, N. Guinea.

Aspidium subtriphyllum HOOK. ; HAYATA in Tōkyō Bot. Mag. XXII. p. 25.

Polystichum ROTH.

Polystichum falcatum DIELS var. **caryotideum** (WALL.) ; HAYATA in Tōkyō Bot. Mag. XXIII. p. 25.

Polystichum stenophyllum CHRIST in Bull. Soc. Bot. France LII. Mém. I. p. 27.

Polystichum niitakayamense Hayata in Tōkyō Bot. Mag. XXI. p. 14 ; et Fl. Mont. Formos. p. 243, t. 41.

Distrib. East Tibet, China.

Polystichum transmorrisonense Hayata sp. nov. Stipites straminco-rubescentes 25 cm. longi supra bisulcati semiteretes subtus convexi basi fuscentes dense squamati, (squamis lanceolato-subulatis, 5 mm. longis basi latissimis 1-1½ mm. latis fuscentibus), etiamque plus minus parcissime strigosi. Frondes ovato-lanceolatæ 30 cm. longæ 10 cm. latæ, apice obtusæ, vel acutæ, basi truncatæ, a medio deorsum æquilatæ, sursum gradatim angustatæ, bipinnatæ, pinnis utraque latere 20, inferioribus a se 2-3 cm. remotis, pinnis infimis pinna mediocri conformibus æquilongis vel paullo brevioribus, pinnis mediocribus a rhachibus transverse patentibus vel paullo descendentibus angusto-lanceolatis 5 cm. longis 14 mm. latis apice acuminatis basi æquilatis sessilibus apice lobulatis sursum pinnatifidis cæterum pinnatis ; pinnulis utraque latere 12-14 inferioribus a se 2 mm. vel 1 mm. remotis angusto-quadrangularibus inferioribus 7 mm. longis 3 mm. latis apice obtusis vel rotundatis basi æquilatis margine plus minus revolutis lobulato-dentatis, (dentibus brevissimis semiglobosis utraque latere 4). Rhaches frondium supra bi-sulcatæ 1½-2 mm. latæ dense pilosæ etiamque squamatæ subtus convexæ, squamis lanceolatis 4 mm. longis 1 mm. latis fuscentibus ; rhaches pinnarum complanatæ supra elevatæ subsulcatæ, utraque latere sulcorum densissime minute hirsutæ subtus plus minus elevatæ parcissime hirsutæ etiamque squamatæ, (squamis lanceolatis basi cordato-dilatatis 2½ mm. longis ad basin ½ mm. latis apice acuminato-linearibus). Paginæ supra ad venas et venulas parcissime hirsutæ, pilis plus minus crispato-recurvis ⅔ mm. longis rubris, subtus ad venas et venulas

parcissime brevissime hirtellæ, pilis albis brevissimis ¼ mm. longis. Sori sub quoque dente pinnularum 1, utraque latere costæ 3-4, rotundati, 1 mm. in diametro, ad apicem venularum terminales. Indusium persistens cordatum, margine eroso-integrum.

HAB. in Montibus Centralibus.

Near *D. Kawakamii*, but differs from it in having somewhat scaly and curled hairs on the fronds, and in the transversely spreading and sometimes descending pinnæ. *D. Kawakamii* has very rigid and straight hairs on the fronds, and its pinnæ are more or less ascending. The present plant should better be referred to *Dryopteris* on account of its habit and texture. (See p. 449).

Polystichum dimorphophyllum* HAYATA sp. nov. *Aspidium dimorphyllum* T. ITŌ (in sched.) in Herb. Tōkyō. Rhizoma repens densissima squamatum, (squamis stramineo rubescentibus basi lanceolatis 1 cm. longis apice linearibus). Stipites 18 cm. longi complanati basi 3 mm. lati apice 1½ mm. lati supra late sulcati subtus convexi parcissime squamati straminei. Frondes (steriles) coriaceæ rhombeo-triangulares apice acuminatæ 20 cm. longæ basi latissimæ 14 cm. latæ, partibus infimis tri-pinnatis, inferioribus mediocribus nec non superioribus bi-pinnatis, prope apicem simpliciter pinnatis, pinnis utraque latere frondium 12, inferioribus 3½ cm. a se remotis ; pinnis infimis longissimis 10 cm. longis lanceolatis 4 cm. latis a rhachibus frondium angulo 40° divaricatis subrectis vel ascendento-rucurvatis apice acuminatis basi obtusis, breve petiolatis inferiore bipinnatis superiore simpliciter pinnatis prope apicem pinnatifidis ; pinnulis 1. infimis lanceolatis 4 cm. longis 1½

* It is provisionally named *Aspidium dimorphyllum* by Dr. T. ITŌ in a label of the specimen in the Herbarium at Tōkyō, which species, however, has never been described. As the name *dimorphyllum* is etymologically incorrect, I have ventured here to describe the plant as *P. dimorphophyllum*, referring it to the genus *Polystichum*.

cm. latis apice acuminatis basin obtusis, pinnulis II. infimis oblique ovatis latere superiore majoribus 11 mm. longis 6 mm. latis apice aristatis basi cuneato-attenuatis brevissime petiolulatis margine 3-4-5-serrulatis, serrulis aristatis ; rhaches frondium complanatæ supra sulcatæ (etiamque) a latere sulcatæ subtus convexæ ; rhaches pinnarum complanatæ supra sulcatæ sursum subalatæ, subtus parcissime squamatæ. Frondes (fertiles) lanceolatæ vel ovatæ in ambitu, apice lineari-acuminatæ basi obtusæ, partibus inferioribus tripinnatis, superioribus bi-pinnatis, versus apicem simpliciter pinnatis, pinnis utraque latere 12 inferioribus 5 cm. a se remotis, longissimis 9 mm. longis remote pinnatis circ. lincaribus, pinnulis I. lincaribus ; pinnulis II. ovatis acutis basi attenuatis 7 mm. longis 3 mm. latis margine 3-4-dentato-lobatis, lobis ascendentibus acutis ad tatam laminam soriferis cum soris reflexis. Sori sub quoque lobo circ. 1, interdum 2, prope costas siti, globosi, 2 mm. in diametro, a se approximati, totam paginam occupantes. Indusium globosum basi profunde cordatum 2 mm. in diametro.

Hab. Liukiu : Nagodake, Aprili. 1907, leg. G. Nakahara.

The present plant is very remarkable for its dimorphous fronds. It is very near *Polystichum apiifolium* (Sw.) C. Christensen, but differs from it by the much contracted fertile fronds. This and its congener are so different from any other species of the genus, that it is much desirable to have a subgenus for them.

Gymnopteris Presl.

Gymnopteris contaminans Bedd. ; Hayata in Tōkyō Bot. Mag. XXIII. p. 26.

Dipteris Reinwardt.

Dipteris conjugata Reinw.; C. Christensen Ind. Fil. p. 242.

HAB. Shōtōkaku, leg. K. MIYAKE, 1897.
DISTRIB. Asia, Tropical Polynesia.

Oleandra CAV.

Oleandra Wallichii PRESL. ; C. CHRISTENSEN Ind. Fil. p. 467.
HAB. Randaisan, leg. U. MORI, Aug. 1908, (No. 7135).
DISTRIB. North India.

Davallia SM.

Davallia (§ *Eudavallia*) **formosana** HAYATA sp. nov. Stipites triquetro-teretes, supra late sulcati, etiamque utraque latere sulcorum tenuiter sulcati, subtus triangulari-convexi, glabri, stramineo-rubescentes. Frondes late rhomboideo-triangulares 50 cm. longæ 60 cm. latæ apice acutæ basi obtusæ, remote tri-pinnatæ, sursum remote bipinnatæ, pinnis utraque latere 10, inferioribus a se 9-10 cm. remotis, a rhachibus angulo 60° divaricatis, rectis, sursum ascendento-recurvis, infimis longissimis ovato-rhomboideis petiolatis (petiolis 3 cm. longis) cum petiolis 37 cm. longis 17 cm. latis apice acuminatis basi acutis obliquis latere superiore 11 cm. lato, latere inferiore 6 cm. lato, pinnulis I. utraque latere 16, inferiore a se 4 cm. remotis, infimis longissimis acuminato-ovatis 12½ cm. longis 5 cm. latis apice lineari-acuminatis basi rotundatis, pinnulis II. utraque latere circ. 8, inferioribus a se 1½ cm. remotis, infimis longissimis 4 cm. longis 13 mm. latis acuminato-ovatis petiolulatis (petiolulis 3 mm. longis), profunde pinnatifidis, (pinnulis II. sursum simpliciter dentatis), segmentis utraque latere 5-6, inferioribus 5 mm. a se remotis, infimis longissimis 12 mm. longis elongato-ovatis apice obtusis basi cuneato-attenuatis obliquis, (latere superiore quam inferiore latiore), margine inciso-dentatis, (dentibus utraque latere

5-6 approximatis ascendento-recurvis inferioribus 2-3 mm. longis, 1-1½ mm. latis apice obtusis interdum margine 1-2-serrulatis), sub dente inferiore 1-3-soriferis. Rhaches frondium supra late sulcatæ, utraque latere sulcorum etiamque tenuissime sulcatæ, glabræ, inferiore 2½ mm. latæ; rhaches pinnarum supra sulcatæ, subtus convexæ, glabræ; rhaches pinnularum subcomplanatæ, supra sulcatæ, leviter alatæ; paginæ utraque glabræ, membranaceæ supra soris (subtus) elevato-tuberculatæ: venis et venulis supra elevatis, subtus haud elevatis, sed distincte conspicuis. Sori sub quoque dente 1-vel 2-3, ad apicem venularum siti, a margine plus minus remoti, generaliter ½ mm.-1½ mm. remoti. Indusium elongato-quadrangulare, ad basin et latus paginæ adnatum, apice liberum, ambitu U-forme, basi rotundato-truncatum, apice ore abrupte truncatum, ⅔ mm. longum, ½ mm. latum, ore integrum.

Hab. Taichū, Kashigatani, leg. G. Nakahara, Feb. 1907.

Davallia parvipinnula Hayata sp. nov. *D. Clarkei* Hayata in Tōkyō Bot. Mag. XXIII. p. 27.

Stipites 14 cm. longi glabri stramineo-rubescentes basi plus minus purpurascentes, subteretes (supra) profunde 1-sulcati, sursum 2-3-sulcati glabri haud squamati, basi parce squamati, squamis elongato-triangularibus tenuibus leviter rubescentibus margine erosis apice obtusis. Frondes triangulares 19 cm. longæ, a basi 20 cm. latæ, pinnis utraque latere 15, infimis 3-pinnatis 10 cm. longis, inferioribus bi-pinnatis 6-7-8 cm. longis, a se 3-4 cm. remotis, superioribus brevioribus simpliciter pinnatis 3-4 cm. longis, a se 1-2 cm. remotis, sursum minoribus 3 mm.-1 cm. longis, a se 3 mm. remotis; pinnis infimis sessilibus lanceolato-ovatis 10 cm. longis 4½ cm. latis, latere inferiore latiore, 2½ cm. lato; pinnulis I. infimis brevioribus, (inferioribus longioribus sessilibus angustato-

quadrangularibus a se 1-2 cm. remotis pinnatis) ; pinnulis II. ovatis inferioribus 6 mm. longis obtusis angustatis remote profundeque pinnatifidis, segmentis angustissimis remotis cochlearibus bicornutis, cum cornibus 1-3 mm. longis 1-$\frac{1}{4}$ mm. latis basi stipitatis, (cornibus exterioribus longioribus, interioribus brevioribus) sinibus inter cornua rotundatis ; rhaches frondium supra leviter tenuissime bisulcatæ, subtus convexæ, utrinque glabræ ; rhaches pinnarum subcomplanatæ supra plus minus sulcatæ, subalatæ ; paginæ membranaceæ utraque glabræ. Sori ad sinus furcæ venularum, vel interdum ad angulos venularum flexarum ad centrum segmentorum pinnularum II. siti, solitarii. Indusium semiglobosum $\frac{2}{3}$ mm. latum $\frac{1}{2}$ mm. longum basi leviter cordatum vel truncatum.

Hab. in monte Morrison, leg. T. Kawakami et U. Mori, (No. 1823).

Near *D. Clarkei*, but differs from it in having cordate indusia.

Davallia subalpina Hayata sp. nov. Rhizoma repens, incrassatum, subteres, 4 mm. in diametro, dense squamatum, squamis imbricatis fulvo-rubescentibus cuspidato-triangularibus vel elongato-triangularibus 5-6 mm. longis a basi 2-2$\frac{1}{2}$ mm. latis. Stipites basi squamati, sed supra basin subito nudi, subglabri, 25 cm. longi, 2$\frac{1}{2}$ mm. in diametro, subteretes, facie (supra) profunde sulcati, stramineo-rubescentes. Frondes ovatæ, vel late ovatæ, 35 cm. longæ, 31 cm. latæ, apice acutæ basi obtusæ, a medio deorsum tri-pinnatæ, sursum bi-pinnatæ, versus apicem pinnatæ, pinnis remotis utraque latere 12, inferiore 7 cm. a se remotis, sessilibus, infimis brevioribus, inferioribus longioribus lanceolatis 17 cm. longis 7 cm. latis apice acuminatis basi obtuso-truncatis remote pinnatis, pinnulis I. utraque latere 16 inferioribus a se 17 mm. remotis longissimis (infimis brevioribus) lanceolatis, 4 cm. longis, 18mm. latis, brevissime

petiolulatis (petiolulis 1 mm. longis), remote etiamque pinnatis, pinnulis II. utraque latere 8 inferiore 5 mm. a se remotis oblique elongato-quandrangularibus inferioribus 8 mm. longis 4 mm. latis brevissime petiolulatis pinnatifidis, segmentis latere superiore 3-4 patentibus oblique ovatis apice furcato-lobatis basi attenuatis 3 mm. longis 2 mm. latis, lobis exterioribus longioribus 1½ mm. longis acutis, interioribus brevioribus 1 mm. longis acutis, ad centrum segmentorum soriferis ; segmentis latere inferiore 1-2 acuto-ascendentibus lineari-ovatis 3½ mm. longis ¾ mm. latis apice subacutis simplicibus haud soriferis ; paginæ membranaceæ, utrinque glabræ ; rhaches frondium subcomplanatæ supra late sulcatæ, utraque latere sulcorum etiamque tenuissime sulcatæ subglabræ inferiore 1½ mm. latæ, subtus convexæ plus minus costatæ ad ramificationem squamatæ ; rhaches pinnarum complanatæ supra leviter sulcatæ glabræ subtus convexæ sursum plus minus alatæ inferiore ⅔ mm. latæ ; rhaches pinnularum complanatæ sulcatæ, ½ mm. latæ ; venulæ latere superiore pinnularum II. a medio furcatæ, ad sinus furcæ soriferæ, ramis venularum prope apicem loborum evanescentibus. Sori circ. semiglobosi ½ mm. lati. Indusium semiglobosum vel depresso-ovato-globosum, margine integrum, apice rotundatum basi leviter contractum truncatum, ⅔ mm. latum, ½ mm. longum, ecoloratum.

Hab. in Arizan, leg. G. Nakahara, 1906, Nov.

Near *D. affinis* Hook et *D. chærophylla* Wall , but differs from both in the venation of the fronds.

Microlepia Presl.

Microlepia obtusiloba Hayata in Tōkyō Bot. Mag. XXIII. p. 27.

Microlepia quadripinnata Hayata sp. nov. Stipites 28 cm. longi, basi pilosissimi, (pilis crispatis depressis densis), etiamque basi squamati, (squamis nigricantibus lanceolatis 4½ mm. longis 1½ mm. latis apice cuspidatis basi rotundatis extus glabris sub lente intus dense pilosis vel glabris), basi fuscentes, a medio sursum stramineo-flavescentes, subnitidi, supra sulcati, subteretes. Frondes late rhomboideo-triangulares, 32 cm. longæ, 40 cm. latæ, apice acutæ, vel acuminatæ, basi acutæ vel obtusæ, hirsutæ, herbaceæ, partibus infimis quadri-pinnatis, inferioribus tri-pinnatis, superioribus bi-pinnatis, sursum simpliciter pinnatis, pinnis utraque latere rhachis frondis 18, plus minus alternis, inferioribus circ. 6-7 cm. a se remotis subrectis apice ascendento-recurvatis a rhachibus angulo 60° divaricatis, pinnis infimis lati triangularibus oppositis 22 cm. longis 20 cm. latis, latere inferiore latiore 12 cm. latis, petiolatis, (petiolis 2-3 cm. longis), pinnulis I. utraque latere 16 inferioribus 4 cm. a se remotis, infimis elongato-triangularibus 13 cm. longis 6 cm. latis apice acuminatis petiolulatis, (petiolulis 1 cm. longis), remote pinnatis ; pinnulis II. utraque latere 15, inferioribus a se 1-2 cm. remotis, infimis longissimis triangulari-lanceolatis 4½ cm. longis 2 cm. latis remote pinnatis ; pinnulis III. utraque latere 6, inferioribus a se 7 mm. remotis, oblique ovatis apice obtusis basi oblique cuneatis subsessilibus 1 cm. longis 8 mm. latis, etiamque pinnatis vel pinnatifidis, segmentis inferioribus obliquis obovatis apice obtusis basi cuneato-attenuatis 4 mm. longis 2 mm. latis pauci-dentatis, (dentibus utraque latere 2-3), segmentis superioribus obovatis obliquis subunilateralibus dentatis vel integris ; rhaches frondium complanatæ semi-teretes supra sulcatæ, ad utrinque latus sulcorum dense hirsutæ cæterum glabræ, subtus convexæ, glabræ, stramineæ ; rhaches pinnarum supra leviter sulcatæ, vel elevatæ, sursum sub-

alatæ, supra dense hirsutæ, subtus glabræ; rhaches pinnularum I. II. et III. complanatæ, supra densissime hirtellæ subtus glabræ, venis et venulis utrinque hirsutis; paginæ secus venas et venulas utraque hirsutæ, venulis apice furcatis, ramis superioribus brevioribus apice soriferis, ramis inferioribus longioribus non soriferis, interdum venulis simplicibus soriferis, vel sterilibus, ramis prope apicem evanescentibus. Sori sub quoque dente segmentorum vel venularum III. 1, a apice dentium $\frac{1}{2}$-1 mm. remoti, ad apicem ramorum venularum terminales. Indusium late cordatum $\frac{1}{2}$ mm. latum margine ciliatum.

Hab. Nantō: Mushazan, leg. T. Kawakami et U. Mori, 1906, Aug. (No. 2390).

Very near *M. hirsuta* but differs from it by the much thinner texture and quadri-pinnate fronds.

Monachosorum Kunze.

Monachosorum subdigitatum Kuhn; Hayata in Tōkyō Bot. Mag. XXIII. p. 28.

Diplazium Sw.

Diplazium Kawakamii Hayata sp. nov. Stipites 55 cm. longi, complanato-tetragoni, 4-sulcati, a basi 7 mm. lati, fuscentes, tota longitudine dense piloso-squamati, (squamis linearibus incrassatis sub-teretibus, plus minus complanatis, basi muricatis, fuscentibus, plus minus crispatis, 3-4 mm. longis, patento-reflexis, vel depresso-reflexis). Frondes late ovatæ, 87 cm. longæ, 60 cm. latæ, apice acutæ, basi obtusæ, tripinnatæ, superiore bi-pinnatæ, pinnis lanceolatis utraque latere 10, a rhachibus frondium anglo 40-60° divaricatis inferioribus 40-45 cm. longis, a se 13-17 cm. remotis,

pinnis juxta-infimis longissimis 45 cm. longis 17 cm. latis apice acuminatis obtusis longe vel breve petiolatis, (petiolis 3-4 cm. longis), remote pinnatis, pinnulis I. utraque latere 20 inferioribus 5 cm. a se remotis ovato-lanceolatis 10 cm. longis 33 mm. latis apice acuminatis, (acuminibus linearibus) basi obtusis breve petiolulatis, (petiolulis 3 mm. longis), etiamque pinnatis, pinnulis II. utraque latere 18 inferioribus a se 8 mm. remotis lanceolatis $1\frac{1}{2}$ cm. longis 6 mm. latis apice obtusis basi obtusis prope basin latissimis basi constrictis 2 mm. latis latere inferiore plus minus decurrentibus margine truncato-dentatis, (dentibus utraque latere 8 infimis longissimis obtusis interdum paucissime serratis 3 mm. longis 2 mm. latis apice truncatis ascendentibus) ; pinnulis I. apice attenuato-acuminatis dentato-lobulatis, lobis vel dentibus truncatis ascendentibus ; rhaches frondium complanato-tetragonæ, supra et subtus late leviter sulcatæ, vel simpliciter concavæ, a basi 4 mm. latæ, inferiore dense superiore paucissime squamatæ, (squamis fuscentibus filiformibus patento-reflexis) ; rhaches pinnarum complanatæ subtetragonæ supra sulcatæ utraque latere sulcorum elevato-alatæ subtus convexæ stramineæ subglabræ ; rhaches pinnularum complanatæ supra sulcatæ subtus elevatæ a latere alatæ, etiamque secus sulcos utrinque latere prominente verticaliterque alatæ (alis secus sulcos hac atque illac interruptis $\frac{3}{4}$ mm. latis ; paginæ exsiccato supra fuscentes, glabræ, subtus plus minus pallidiores subglabræ, venis et venulis supra impressis subtus leviter elevatis. Sori juxta costam sub quoque dente 1, ad venulas unilaterales, sed ad basin venularum bilaterales oblongi prominentes $1\frac{1}{2}$ mm. longi $\frac{3}{4}$ mm. lati utrinque obtusi.

HAB. Tōzan, leg. T. KAWAKAMI et G. NAKAHARA, 1906.

Somewhat near *D. divisissimum* CHRIST, but differs from it by the the lobesof the pinnæ.

Diplazium Morii HAYATA sp. nov. Stipites 46 cm. longi a basi 4 mm. lati, fulvo-straminei, basi fuscentes, subteretes, a latere complanati, supra profunde 1-sulcati, utraque latere sulcorum 1-striati, (striis tenuissimis distinctis fusco-coloratis), parcissime squamati, squamis tenuissimis fulvo-fuscentibus lanceolatis 2-3 mm. longis. Frondes rhomboideo-triangulares, 55 cm. longæ, 50 cm. latæ, apice acutæ, basi obtusæ, a medio deorsum bi-pinnatæ, a medio sursum simpliciter pinnatæ, pinnis utraque latere 11, inferioribus 12 cm. a se remotis, a rhachibus frondium angulo 60 divaricatis; infimis longissimis elongato-ovato-triangularibus 29 cm. longis 11 cm. latis apice abrupte acuminatis (acuminibus lincaribus) basi truncatis latissimis 11 cm. latis, petiolatis, (petiolis 2-3 cm. longis), partibus superioribus pinnatifidis, a medio inferiore pinnatis, pinnulis utraque latere 8, inferioribus 2 cm. a se remotis, a rhachibus angulo 90° divaricatis, vel inferioribus reflexis, mediocribus elongato-quadrangularibus apice caudato-acuminatis, basi sessilibus truncatis, latissimis, 6 cm. longis, a basi 2 cm. latis, margine dentato-pinnatifidis, lobis utrinque latere 12, inferioribus 6 mm. longis 4 mm. latis apice truncatis a se approximatis margine denticulatis vel subintegris plus minus ascendentibus vel circ. transverse divaricatis; pinnulis apice denticulatis acuminatis. Rhaches frondium tetragonæ, (angulis obtusis,) glabræ, a latere compressæ, supra profunde sulcatæ, utraque latere prope sulcorum tenuiter distincte 1-striatæ, subtus plus minus convexæ glabræ, latere basi 2½ mm. latæ; rhaches pinnarum iis frondium conformes, sed latere etiamque supra sulcatæ; venis et venulis utraque plus minus elevatis; paginæ utraque

glabræ exsiccato supra pallido-fuscentes subtus plus minus pallidiores herbaceæ secus costas pinnularum prominente verticaliter 2-alatæ, (alis hac atque illac interruptis) venulis simplicibus vel a medio furcatis liberis ad apicem denticulorum attingentibus. Sori ad basin venularum prope costas generaliter uni-lateraliter, sed interdum bilateraliter, siti, lineares 3-4 mm. longi, $\frac{2}{3}$ mm. lati.

HAB. Randaizan, leg. T. KAWAKAMI et U. MORI, 1908. Aug.

Near *D. leptophyllum* BAKER, *D. esculentum* and also *D. giganteum*, but differs from them by the lobes of the pinnæ. Also very like *D. Meyenianum* PR. from which this is distinguishable by the much larger lobes of the pinnæ.

Diplaziopsis C. CHR.

Diplaziopsis javanica C. CHRISTENSEN Ind. Fil. p. 227.

Allantodia javanica BEDD.; MATSUM. et HAYATA Enum. Pl. Formos. p. 601.

HAB. Randaizan, leg. U. MORI, 1908.

Asplenium LINN.

Asplenium laserpitiifolium LAM. var. **morrisonene** HAYATA in Tōkyō Bot. Mag. XXIII. p. 29.

Asplenium resectum SM. var. **rahaœnse** HAYATA n. v. Stipites 30 cm. longi 3 mm. lati, basi valde complanati, late sulcati, paucissime pubescentes, supra basin glabri, purpureo-nigricantes, nudi. Frondes cuneiformes vel elongato-triangulares, 30 cm. longæ,

stipitem in longitudine æquantes, 16 cm. latæ, pinnatæ, prope apicem lobulatæ, apice acuminatæ, basi latissimæ et truncatæ, pinnis (infimis longissimis) utraque latere 27, inferioribus 13 mm. a se remotis, a rhachibus frondium angulo 70° divaricatis subrectis, sed sensim paullo versus apicem ascendento-recurvis, subsessilibus vel brevissime petiolatis, infimis angustatis 9 cm. longis 16 mm. latis plus minus ascendento-falcatis vel subrectis, mediocribus 6½ cm. longis 13 mm. latis subrectis vel ascendento-recurvatis a basi usque ad prope apicem æquilatis apice obtusis basi valde obliquis (latere superiore latiore basi truncato rhachi frondis parallelo, vel subparallelo recto integro, margine superiore duplicato-serratis) (latere inferiore angusto, margine inferiore duplicato-serrato basi acuto, prope basin acuto basi a rhachi frondis 1 cm. remoto,) Trondes apice acuminatiæ, lobulatæ, lobis obovatis simplicibus vel pauci-serratis, Rhaches frondium complanatæ supra sulcatæ, (sulco fusco-stramineo), subtus convexæ, nitidæ, purpureo-nigricantes; costis et venis pinnarum subtus plus minus purpurascente coloratis, supra ecoloratis, venis parallelis angulo 40 a costis divaricatis (inferioribus 2 mm. a se remotis), furcatis, ramis superioribus soriferis; paginæ herbaceo-membranaceæ, supra viridissimæ, subtus paullo pallidiors vel concolores. Sori utraque latere costæ 1-seriatim. dispositi, lineares, ad ramos superiores venularum furcatarum latere superiore uni-laterales, rarius ad ramos venularum bilaterales. Indusium lunulato-lineare 7 mm. longum 1 mm. latum.

Hab. Rahao, leg. K. Miyake, Oct. 1899; Randaizan, leg. B. Hayata et U. Mori, 1908, Oct.

The present plant was provisionally named *A. rahaœnse* by Mr. Y. Yabe, but the species was not been described by him, nor was

it published. While working here at Kew, I have examined the plant and found that it comes very near to *A. resectum*, from which it can not be regarded as specifically different. I have, therefore, thought it better to describe it myself, as representing a variety of the same species.

Asplenium tozanense HAYATA sp. nov. Rhizoma ascendens, suberectum, gemmis turbulenter revolutis, squamis dense obtectis squamis lanceolatis basi latissimis 3 mm. longis 1 mm. latis vel longioribus fulvo-rubescentibus. Stipites cæspitosi erecti graciles 18 cm. longi stramineo-flavescentes, basi fusconigricantes semiteretes, supra late sulcate, 1 mm. lati, subtus convexi, plus minus nitidi, tenues, a basi usque ad medium paucissime squamati, (squamis minoribus), sursum nudi. Frondes tenues, herbaceæ, virides, lanceolatæ, vel oblongo-triangulares, plus minus falcato-recurvatæ, vel rectæ, stipitem in longitudine æquantes, apice acuminatæ, basi truncatæ, latissimæ, vel a medio usque ad basin æquilatæ, a medio sursum sensim angustatæ, a medio deorsum bipinnatæ sursum simpliciter pinnatæ, prope apicem pinnatifidæ, pinnis utraque latere circ. 20, inferioribus 3 cm. longis, a se 1½ cm. remotis, superioribus ascendentibus, mediocribus horizontaliter patentibus, inferioribus reflexo-patentibus, infimis angulo 120° a rhachi divaricatis, pinnis alternis, mediocribus elongato-triangu laribus 3 cm. longis 11mm. latis petiolatis (petiolis 1½ mm. longis) basi remote pinnatis apice pinnati-fidis, pinnulis inferioribus oblique obovatis 7-8 mm. longis 4 mm. latis apice obtusis basi breve attenuatis vel cuneato-acutis utraque latere 3-4-dentatis, dentibus obtusis vel acutis ; pinnulis utraque latere 8-9, inferioribus 3 mm. a se remotis apice pinnati-fidis, lobis serriformibus ascendentibus. Rhaches frondium complanatæ, supra sulcatæ, subtus convexæ, subglabræ vel parcissime pubescentes, sursum subala-

tæ, ½ mm. latæ, rectæ; rhaches pinnarum complanatæ, tenuissimæ, alatæ, ½ mm. latæ, (medio costis supra planis subtus prominentibus) supra utraque latere costarum elevato-striatæ, ad striam remote pilis aristatis dispersæ, pilis plus minus recurvis a latere complanatis, 1 mm. longis, ¼ mm. a basi latis; paginæ supra parcissime aristato-pilosæ, (pilis 1 mm. longis, ¼ mm. a basi latis, complanatis, patentibus), subtus glaberrimæ, venis simplicibus vel furcatis, venulis simplicibus liberis apice prope pinnularum apicem evanescentibus. Sori utrinque latere costarum pinnularum 2-3-4, arcte prope costas dispositi, elongato-oblongi, ad basin venularum latere superiore laterales. Indusium elliptico-oblongum 1¾ mm. longum, ¾ mm. latum, marginibus liberis erosis, unilateraliter venula adnatum.

Hab. Tōzan, leg. G. Nakahara, 1907.

Near *A. varians*, but differs from it in the shape of the pinnæ and pennules.

Athyrium Roth.

Athyrium oppositipennum Hayata sp. nov. Stipites 10 cm. longi, subglabri, plus minus minute muricati, supra tenuissime bisulcati. Frondes ambitu lanceolatæ, membranaceæ graciles 19 cm. longæ, 8 cm. latæ, apice acutæ, basi obtusæ, 1-2-pinnatæ, pinnis horizontaliter transverse patentibus utraque latere 14, inferioribus a se 2 cm. remotis, juxta-infimis longissimis lanceolatis, 5½ cm. longis, 1 cm. latis, a basi usque ad medium incurvo ascendentibus sursum recurvis descendentibus; pinnis versus apicem frondis simplicibus brevioribus in lobos apicales abeuntibus; pinnis mediocribus basi pinnatis a medio sursum pinnatifidis vel ad totam longitudinem pinnatifidis, vel sursum dentato-pinnatifidis apice dentatis; pinnulis vel segmentis

pinnarum basilarium angustis 7 mm. longis 2 mm. latis apice obtusis basi plus minus contractis supra basin latissimis margine revoluto-dentatis (dentibus utraque latere 5-6 transverse patento-descendentibus rotundatis vel obtusis). Rhaches frondium supra tenuiter bisulcatæ, vel profunde 1-sulcatæ, brevissime pubescentes, subtus parcissime squamatæ vel haud squamatæ, brevissime pubescentes, deorsum prope insertionem pinnæ glandulis oblongis ½-1 mm. longis instructæ; rhaches pinnarum complanatæ, supra sulcatæ, subalatæ, basi squamatæ; paginæ utrinque glabræ, venis et venulis supra impressis, subtus elevatis omnibus liberis. Sori lunulati, ad venulas laterales, ad paginam pinularum basilarium inter rhachin et margnem utraque latere costæ 1-seriatim 7-dispositi. Indusium lunulato-semiglobosum, medio recurvum 1 mm. longum, ½ mm. latum.

HAB. in monte Morrison, leg. T. KAWAKAMI et U. MORI, Oct. 1906. (No. 1863).

Near *Asplenium prolixum*, but differs from it in the shape of the pinnæ.

Blechnum LINN.

Blechnum Hancockii HANCE; MATSUM. et HAYATA Enum. Pl. Formos. p. 608.

HAB. Randaizan, leg. U. MORI, 1908, Aug. (No. 7133).

Pellæa LINK.

Pellæa Fauriei CHRIST? MATSUM. et HAYATA Enum. Pl. Formos. p. 611.

Pteris cheilanthoides HAYATA in MATSUM. et HAYATA Enum. Pl. Formos. p. 619.

Cryptogramma R. Br.

Cryptogramma Brunoniana Wall. ; Hayata in Tōkyō Bot. Mag. XXIII. p. 32.

Plagiogyria Kunze.

Plagiogyria euphlebia Mett. ; C. Christensen Ind. Fil. p. 495.

Hab.. Taitō : Bunshiseki, leg. T. Kawakami et U. Mori, 1906, Dec. (No. 2351).

Distrib. Japan, China, North India, Tropical Australia.

Plagiogyria Hayateana Makino in Tōkyō Bot. Mag. XX p. 245.

Plagiogyria Matsumureana Hayata Fl. Mont. Formos. p. 244. (non Makino).

Pteris Linn.

Pteris flavicaulis Hayata sp. nov. Stipites 30 cm. longi subtetragoni supra sulcati angustati subtus latiores, a latere late sulcati, glabri, basi paucissime vel haud squamati, flavescentes. Frondes membranaceæ, utraque glabræ, pallido-flavescentes ovato-lanceolatæ, 57 cm. longæ, a basi latissimæ 34 cm. latæ, apice acuminatæ, basi obtusæ, pinnatæ, pinnis utraque latere 14 inferioribus 6 cm. a se remotis a rhachibus frondium 40°-50° divaricatis, subrectis vel plus minus ascendento-recurvatis inferioribus æquilongis 29 cm. longis, infimis a latere inferiore cum pinnulis 1 instructis, pinnula a pinna infima angulo 40° divaricata, quam pinna infima breviore, cum pinna mediocri conformi ; pinnis mediocribus breve petiolatis (petiolis 5 mm. longis) elongato-

lanceolatis 17 cm. longis 3½ cm. latis a basi 3 cm. latis apice acuminato-caudatis (caudis 3 cm. longis 2-3 mm. latis obtusis) basi truncatis latere superiore angustioribus latere inferiore latioribus pinnatifidis, segmentis linearibus utraque latere 25 inferioribus a se 4 mm. remotis (a latere inferiore pinnarum) transverse patentibus plus minus ascendento-recurvatis, 23 mm. longis 2½ mm. latis, apice obtusis basi abrupte dilatis sinibus inter segmenta latis rotundatis ; rhaches inter segmenta opposita 3 mm. latæ. Rhaches frondium tetragonæ supra profunde sulcatæ a latere late sulcatæ, glabræ, inferiore 1½ mm. latæ ; costæ pinnarum elevato-2-striatæ, subtus prominentes, venis et venulis utrinque tenuiter elevatis ; areolis costalibus inter venas laterales 1, linearibus 6 mm. longis 1 mm. latæ ; venulis liberis a medio furcatis, ramis ad marginem segmentorum attingentibus. Sori ad totam marginem frondium marginales. Indusium ½ mm. latum.

Shinyeshō, leg. G. NAKAHARA, Oct. 1905, (No. 583).

Pteris longipinna HAYATA sp. nov. Stipites 40 cm. longi, subteretes, plus minus complanati, basi 2 mm. lati, vel latiores, supra profunde bi-sulcati straminei, basi stramineo-rubescentes, basi squamati, (squamis lanceolato-linear-acuminatis ½-1 cm. longis 1 mm. latis) supra basin nudi, ad totam longitudinem minute muricato-scabri. Frondes ambitu flabellato-globosæ, 30 cm. longæ totiusque latæ, stipitem in longitudine æquantes, pinnatæ, pinnis inferioribus longioribus, superioribus brevioribus, superrimis brevissimis, (etaque) in ambitu apice perfecte truncatæ, pinnis utraque latere 5 oppositis inferioribus a se 4 cm. remotis, pinnis 1 vel 2 inferioribus furcato-bifidis longissimis frondem in longitudine æquantibus ascendentibus arcuatis sursum pinna terminali parallelis, pinnis infimis sessilibus linearibus basi obliquis (latere superiore brevissime acuto

sessili, latere inferiore acuminato infracto a rhachi 5 mm. remoto), juxta basin furcatim fissis, segmentis superioribus longioribus segmenta inferiora $\frac{3}{2}$-plo in longitudine æquantibus lincaribus 30 cm. longis 8 mm. latis apice acutissimis (acuminibus lincaribus tenuissimis arcuato-recurvis) ; pinnis mediocribus simplicibus lincaribus apice acutissimis basi latere superiore angulato-acutis, basi latere inferiore decurrentibus ; pinnis superioribus basi latere inferiore valde decurrentibus, partibus decurrentibus $1\frac{1}{2}$ cm. longis ; paginæ utraque glabræ margine repandato-subintegræ tenuiter membranaceæ, costis supra leviter subtus prominenter elevatis, venis basi vel medio bi-furcatis parallelis. Indusium marginale 1 mm. latum.

Hab. in monte Morrison, leg. T. Kawakami et U. Mori, 1906. Oct. (No. 1875).

Near *P. longipes* Don., but differs from it in having much longer pinnæ.

Pteris morrisonicola Hayata in Tōkyō Bot. Mag. XXIII. p. 33.

Coniogramme Fée.

Coniogramme fraxinea Diels ; C. Christensen Ind. Fil. p. 185.

Distrib. Asia : Japan, China ; Australia, Polynesia, tropical Africa.

Coniogramme japonica Diels ; C. Christensen Ind. Fil. p. 185.

Distrib. Japan.

Polypodium Linn.

Polypodium cucullatum Nees ; Hayata in Tōkyō Bot. Mag. XXIII. p. 77.

Polypodium quasidivaricatum HAYATA n. n. *Polypodium divaricatum* HAYATA in Tōkyō Bot. Mag. XXIII. p. 78, (non FOURN.)

Polypodium Engleri LUERSS. ; C. CHRISTENSEN Ind. Fil. p. 525.

HAB. Randaizan, leg. T. KAWAKAMI, (No. 7079).

DISTRIB. Japan.

Polypodium Hancockii BAKER ; MATSUM. et HAYATA Enum. Pl. Formos. p. 631.

HAB. Kusshaku, leg. G. NAKAHARA.

Polypodium Engleri LUERSS. var **hypoleucum** HAYATA n. v. Rhizoma repens 2½ mm. in diametro dense squamatum, squamis tenuibus semi-hyalinis (primum rubro-fulvescentibus demum ferrugineis), acuminato-ovato-lanceolatis 4 mm. longis 1 mm. latis basi peltatis, partibus infra insertionem 1 mm. longis rotundatis, squamis ad apicem alabastrorum frondium acuminato-linearibus 6 mm. longis ¾ mm. latis a basi peltatis, partibus infra insertionem 3-lobatis ⅓ mm. longis. Stipites basi squamati supra basin subito nudi glabri straminei vel plus minus purpurascentes subteretes facie sulcati 7 cm. longi 1 mm. in diametro. Frondes lineari-lanceolatæ 22 cm. longæ 2 cm. latæ apice acuminatæ basi obtusæ plus minus attenuatæ chartaceo-membranaceæ margine repandato-undulatæ, undulis 7 mm. latis, costis purpurascentibus vel stramineis, supra planis distincte conspicuis, subtus elevato-prominentibus, venis distinctis exsiccato indico-coloratis tenuibus subrectis a costa angulo 50° divaricatis ad sinum undularum vix attingentibus apice ramosis prope marginem evanescentibus a se 5 mm. remotis, venulis inter venas costa parallelis reticulatis, areolam formantibus, (areolis oblique quadrangularibus 2-3 mm. longis totiusque latis venulis liberis apice ramosis ramis recurvis

apice incrassatis); paginæ supra virides subtus glaucæ interdum purpureo-albicantes, a medio sursum frondium soriferæ. Sori inter venas singulariter siti, a costa 3-4 mm. remoti a margine 7 mm. remoti, globosi 2 mm. in diametro.

Hab. Kashigatani, leg. G. Nakahara, Feb. 1907.

The present *Polypodium* comes near *P. Engleri*, but differs from it in the veinlets spreading from the midrib in a much acuter angle. Also near *P. arenarium* Baker and *P. Schrittplinianum* Annit, but differs from the former in having broader fronds which are much acuter on both ends, and in the sori which are limited on the upper parts of the fronds, and from the latter, in having acuter and larger fronds of a different texture.

Polypodium Kawakamii Hayata in Tōkyō Bot. Mag. XXIII. p. 77.

Polypodium Lehmanni Mett.; Hayata in Tōkyō Bot. Mag. XXIII. p. 79.

Polypodium morrisonense Hayata in Tōkyō Bot. Mag. XXIII. p. 78.

Polypodium palmatum Blume?; Hayata in Tōkyō Bot. Mag. XXIII. p. 79.

Polypodium quasipinnatum Hayata n.n. *Polypodium pinnatum* Hayata in Tōkyō Bot. Mag. XXIII. p. 80, (non Poir.).

Polypodium subauriculatum Blume; Hayata in Tōkyō Bot. Mag. XXIII. p. 80,

Polypodium taiwanianum Hayata in Tōkyō Bot. Mag. XXIII. p. 80,

Polypodium trichomanoides Sw. ; C. CHRISTENSEN Ind. Fil. p. 571.

HAB. Formosa, Arizan, leg. S. KUSANO.

DISTRIB. Japan, Tropical America.

Niphobolus KAULF.

Niphobolus fissus BLUME ; HAYATA in Tokyō Bot. Mag. XXIII. p. 34.

Supplements and Corrections.

Acer rubescens HAYATA Materials for a Flora of Formosa p. 66.

The species is very different from *A. insularis* MAKINO, so far as I can ascertain in examining MAKINO's species in the Tokyō-Herbarium, although I have not yet seen his type.

Acer Tutcheri DUTHIE in Kew Bull. (1908), p. 16.

The type does not exist in Formosa.

Rubus fasciculatus DUTHIE in Ann. Bot. Gard. Calc. IX. p. 39.

Rubus conduplicatus DUTHIE (perhaps an unpublished species).

(I am very much indebted to Mr. S. T. DUNN for the above references).

Tashiroea okinawensis MATSUM. mentioned in the present work, p. 114, is not identical with MATSUMURA's type, although they bear great resemblance in external appearance.

Vaccinium japonicum MIQ. var. **lasiostemon** HAYATA n. n.

Vaccinium japonicum MIQ. var. *ciliare* HAYATA Materials for a Flora of Formosa p. 168, (non MATSUM.). After completing this work, I have once more examined the specimen with Mr. S. KOMATSU, and found that it differs a little from the variety *ciliare* which has a distinctly ciliated pedicel and thinly hairly stamens. The pedicels of the present plant are quite or nearly glabrous and the stamens are much more barbate. It may be referred to *V. japonicum* MIQ., but should be regarded as representing another variety of the same species. In this, Mr. S. KOMATSU concurs.

Ficus Awkeotsang MAKINO in Tōkyō Bot. Mag. XVIII. p. 151.

Ficus Hanceana MAXIM. in Mél. Biol. XI. p. 341; MAKINO in Tōkyō Bot. Mag. XVIII. p. 154.

Carex Warburgiana KÜKENTH. in Bull. Herb. Boiss. 2. sér. V. (1905) p. 1162, et in ENGL. Pf.-reich, Caricoideæ p. 564.

Hab. Formosa : Kananin, (WARBURG n. 10890, fide KÜKENTHAL)

Carex chrysolepis FRANCH. et SAV.; KÜKENTHAL in ENGL. Pf.-reich, Caricoideæ p. 564.

Hab. Formosa : Sintiam (WARBURG n. 9280, fide KÜKENTHAL).

Aspidium anastomosans HAYATA n. n. *Dryopteris anastomosans* HAYATA Materials for a Flora of Formosa p. 414.

Aspidium rufinerve HAYATA n. n. *Dryopteris rufinerris* HAYATA Materials for a Flora of Formosa p. 420.

Dryopteris morrisonensis HAYATA n. n. = *Dryopteris spinulosa* O. KTZE var. *morrisonensis* HAYATA Materials for a Flora of Formosa p. 422.

Dryopteris oppositipenna HAYATA n. n. = *Athyrium oppositipennum* HAYATA Materials for a Flora of Formosa p. 441.

Diplazium Morii HAYATA Materials for a Flora of Formosa p. 437 = **Diplazium Dœderleinii** MAKINO = *Asplenium Dœderleinii* LUERSS.

Aspidium aristatum SW. var. *subdimorphum* CHRIST Herb. Boiss. (1896) p. 669.

After completing this manuscript, my attention has been called by Mr. T. MAKINO to CHRIST's variety *subdimorphum* which is mentioned in the paper above cited with following note : " La plante Japonaise montre quelquefois un léger penchant ver le

dimorphisme, vu que les frondes fertiles ont des segments bien plus courts et plus obtus que les steriles. J'ai une plante identique du continent voisin : Sud de la Chine, c. O. WARBURG." So far as I can judge from the note given above, **Polystichum dimorphophyllum** HAYATA mentioned in the present work p. 428, is not to be referable to CHRIST's variety, for the former has entirely dimorphic fronds while the latter looks like a mere form of *P.* (*Aspidium*) *aristatum* which sometimes shows the slightest tendency towards dimorphism. In this, Mr. S. KODAMA concurs. So far as I am aware, the description of CHRIST's variety has never been published.

Athyrium tozanense HAYATA = *Asplenium tozanense* HAYATA Materials for a Flora of Formosa p. 440. After finishing this manuscript, I have, by the suggestion of Mr. T. NAKAI, once more examined the sori of the fern, and have found that there are some indusia which are reflexed backwards at the apex, or on the middle. It should, therefore, be properly referred to *Athyrium*.

Dryopteris quadripinnata HAYATA = *Microlepia quadripinnata* HAYATA Materials for a Flora of Formosa, p. 434. As is suggested by Mr. T. NAKAI, the indusia of the fern are cordate, affixed to the receptacles and quite free on the margin. It should, therefore, be properly transferred to *Dryopteris* from *Microlepia* to which it was erroneously referred.

ERRATA.

P. 3, foot note, for 1), read 2).
„ „ for 2), read 1).
P. 4, line 5 from bottom, for *Allophyllus* read *Allophylus*.
P. 10, line 9 from top, after DIELS', omit the commas.
P. 11, line 15 from bottom, after Aroideæ, put in and.
P. 14, line 13 from bottom, for *panisulata*, read *paniculata*.
P. 18, line 13 from bottom, after *paniculata*, put in semicolons.
P. 21, line 9 from bottom, for arisanensis read arisanense.
P. 23, line 13, for repundata, read repandata.
P. 25, line 9 from top, after ternatis, instead of the commas put in periods.
P. 27, line 1 from top, for longis, read longæ.
„ line 2 from top, for latis, read latæ.
P. 47, line 14 from top, for *sasanqua*, read *Sasanqua*.
P. 55, line 2 from top, after *Hancœna*, omit the commas.
P. 58, line 9 from bottom, for ongis, read longis.
P. 87, line 9 from bottom, for *exerocarpa*, read *xerocarpa*.
P. 88. line 8 from top, for acutis, read acuta.
P. 101, line 11 from top, for ada xillas, read ad axillas.
P. 115, line 4 from top, after Kew, put in commas.
P. 122, line 9 from top, for are, read is.
P. 134, line 4 from bottom, after *dilatatum*, for is, read are.
„ line 7 from bottom, after leaves, omit the a.
P. 169, line 9, after nor, omit is.
P. 303, line 13 from bottom, for pubescentibus, read pubescentes.
„ line 1 from bottom, for a latere, read lateralibus.
P. 310, line 8 from top, for japanese, read Japanese.
P. 311, line 14 from bottom, after this is, put in an a.
P. 332, line 4 from bottom, for Europhia, read Eulophia.
P. 390, line 1 from bottom, for are, read is.
P. 414, line 6 from bottom, for subcupuli, read subcupuli-.

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